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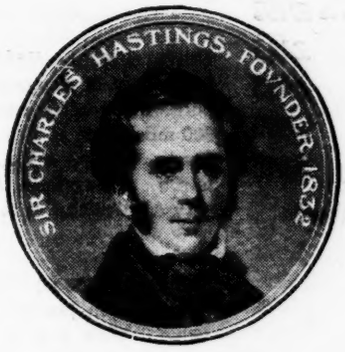

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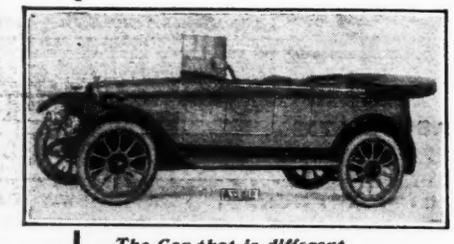

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Observations
ON
THE EFFECT OF CESSATION OF THE IRRITANT ON THE DEVELOPMENT OF EXPERIMENTAL TAR CANCER.*

BY
ARCHIBALD LEITCH, M.D.,
DIRECTOR OF THE CANCER HOSPITAL RESEARCH INSTITUTE, LONDON.

[*With Special Plate.*]

In the development of tar tumours, as well in man as in laboratory animals, a long time elapses before there are any visible signs of tumour formation. In the case of mice that have had frequently repeated applications of coal tar it is not till near the end of three months that we see the beginnings of the neoplastic reaction. During this period the area affected has lost its hairs, temporarily or permanently, and the skin has become harsh and scaly: microscopic examination of that particular part of skin in those mice which have died shows irregularity and hyperplasia of the epithelium, destruction of the hair follicles, disorganization of the papillary processes with their superficial elastic felting, and evidences of chronic inflammatory reaction in the corium. But these features are inconstant, and, as I pointed out in January last when communicating to the Pathological Society the results of a year's observations on experimental tar cancers, there are no specific characteristics which we could label as pre-cancerous. As the time goes on, definite hyperplastic plaques make their appearance in the epithelium and small warty growths are formed. The latter generally start as upgrowths from the surface and are found in their early stages microscopically to consist of a branching stalk of connective tissue covered by proliferated epithelium which on the surfaces is excessively keratinized. The connective tissue stalks are well vascularized, but as the wart grows they become more encroached upon by infoldings of the epithelium, and there is downward proliferation of the epithelium below the bases of the tumours: such ingrowing buds, as a rule, exhibit central keratinization. The papilloma grows, too, by further implication of the neighbouring surface epithelium. The cells of the ingrowth may occasionally lack the usual differentiation. How far this ingrowth must proceed before we can call the tumour malignant is, of course, a matter of opinion. There are no hard and fast lines between simple and malignant tumours at any time, and in these particular tumours where the progress from the one to the other is almost certain no one can draw a sure distinction. When, however, the panniculus carnosus is penetrated few will hesitate to pronounce the tumour malignant. In the living mouse deep infiltration can be appreciated by the fingers after a time, and, if we can exclude inflammatory processes, we may be sure that the deep tissues are penetrated. The tumours may increase to a considerable size on the surface, covered by hard horny material, or they may break down. Metastases occur in the lymph glands, the lungs, or other organs. Occasionally the stage of benign wart formation is omitted, and the first sign of neoplasia is an ingrowth with a superficial ulcer; and in such instances it is difficult to date the commencement.

In some of our former experiments we stopped the applications of tar as soon as basal induration was evident, and we found that nevertheless the tumours went on growing with undiminished rate: the removal of the irritant did not arrest the process when once the malignant stage was reached. The failure therefore to detect a causal agent in a cancerous growth cannot be held to be a proof against the previous existence of such.

Now, what would happen if the irritant were suspended before the tumour had reached a malignant stage? Clinical observations in human cases point to various possibilities; some warts disappear, some remain simple for many years and would presumably continue so indefinitely, and some progress to malignancy: instances of all three are known in the soot warts of chimney-sweeps, in the warts of tar and pitch workers, and in the warts of paraffin workers. It would seem merely to be a question as to how far the development of the wart had gone when the irritation ceased. Yamagiwa and Ichikawa,[1] who were the first to produce tar tumours experimentally, found that when they stopped the applications of tar in rabbits some of the papillomata went on increasing whilst others diminished and disappeared. In my own experiments with rabbits I noticed in several cases that papillomata disappeared though the tar applications were not suspended; and the same thing happens in mice, though apparently less frequently. It cannot therefore be said that the diminution or disappearance of warts is wholly due to the cessation of the irritant. In order to answer the question posed we took two batches of mice which had undergone repeated tar applications for periods of four and five months respectively; the treatment was stopped, and they were examined every few days. Some of these mice already showed evidence of tumour formation, and in all cases we had fairly accurate information regarding the date of their first appearance; in other mice there was no sign whatever of papillomata or even hyperplastic plaques. After the cessation of the tar applications the hair grew again, except where a wart was actually present, and the skin, previously rough, became smooth in some cases and in others remained rough, but the succeeding events could not be correlated with the degree of the return to the apparently normal condition.

Result when Tumours were Present.

When the tar was discontinued there were 15 mice, of which 14 had small warts varying in size from a pinhead to a hempseed at most, the warts having been in existence for different periods from a few days up to a month, and another mouse which had a small subcutaneous tumour with superficial ulceration. Judging from our histological observations on numerous similar growths in animals which died, we would have no hesitation in pronouncing all of them simple, with the possible exception of the one mentioned. The subsequent history of these 15 mice showed that in 5 cases the papillomata disappeared, spontaneously or otherwise, in 3 cases the warts remained simple, 1 had a doubtful ending, and 6 became malignant.

Temporary Tumours.

1. A wart was present, small and flat, less than one-eighth of an inch in diameter, which had arisen within 13 days. It disappeared within a fortnight after the tar was stopped, leaving roughened skin. At the end of 22 days another small flat wart was seen to the right of the site of the former, but after another week it too disappeared, and a rough irregular condition of the skin without further neoplasia continued till the death of the mouse, 71 days after cessation of tar painting. Histological examinat on of the skin showed irregular hyperplasia of the epithelium, with small nodules of epithelial cells isolated in the corium and surrounded by round-cell and fibroblastic reaction. Many of the epithelial masses had degeneration of the central keratin, and appeared as pseudo-cysts. The panniculus carnosus was not encroached upon. (Five months' treatment previously.)

2. A small wart the size of a pinhead was present, which increased slowly in size till 70 days after the tar was stopped, when it appeared as a conical horny wart a quarter of an inch in height. Pulled off, it left merely a small area of abraded skin, which showed no sign of tumour when the mouse died a week later. (Four months' previous treatment.)

3. After tar had been applied for 4 months a minute wart was observed which had grown to the size of a hempseed one month later, when the applications were suspended. It had not increased 13 days later, but a pinhead-sized wart had appeared in front of it, and a scab had formed immediately behind it. At the end of 22 days the scab had taken the place of the larger wart. It was difficult to determine whether there was horn formation or merely a scab. However, it seemed to increase in size and to show induration beneath. This proved to be a septic condition; an axillary gland became infected and the mouse was killed, but no sign of tumour could be detected, merely acute inflammation.

4. Tar had been applied for 5 months. When it was discontinued a minute wart 1 mm. in height, which had not been there a week previously, was found. For a month afterwards it increased slowly in extent, though remaining flat. At the end of 2 months it seemed to show a deeper area of induration, and another tiny wart had appeared near it. A week later it was found that the induration was inflammatory, and pus was evacuated. The animal died at the end of 71 days, and the wart came away at autopsy, leaving no trace of tumour formation underneath.

5. Tar had been applied for 5 months, and a small wart, which had been in existence for a month, showed commencing ulceration, when the tar was stopped. This ulceration had increased, when the animal died 13 days later, but histological examination showed only the necrotic remains of the wart.

* A paper communicated to the Pathological Society of Great Britain and Ireland, July 15th, 1922.

Simple Papillomata.

1. Tar had been applied for 4 months, and had produced a single wart of the size of a hempseed at the end of that time, when the applications were stopped. A fortnight later two other smaller warts appeared in the neighbourhood. Progress was slow: at the end of 48 days there were still three warts, two of the size of hempseeds and the third pinhead size. The mouse died at the end of 63 days, the tumours having shown little advance.

2. Tar applied for 4 months. A small wart appeared in the last 20 days, and when the tar was stopped there were two growing warts. One of these disappeared 20 days afterwards, but the other continued growing. The mouse died in 29 days with a papilloma histologically simple.

3. Tar applied for 4 months: in the last 20 days a wart appeared which had formed a small horn a week old when the tar was stopped. It measured then a quarter of an inch high by one-eighth of an inch thick, and a tiny wart had just appeared in front of it. Twenty days afterwards four warts were found. At the end of a month two of these had disappeared, but another was beginning. In 43 days a papilloma, the size of a large pea, had formed from the coalescence of two neighbouring warts. The warts diminished in number and size, and the mouse died 86 days after the cessation of tar applications. The papillomata were histologically simple.

Doubtful Case.

Tar applied for 5 months. A wart was noticed at the end of the fourth month, two warts in the last 18 days, and when tar was stopped there were four closely set warts all about the size of pinheads. They gave place 15 days later to a flat irregular plaque surrounded by hair. This disappeared, and at the end of 22 days a small pinhead-sized wart appeared in front of this. This in turn gave place to a shallow ulcer which seemed to be healing. At the end of 2 months there was very doubtful superficial induration, and this did not become more definite when the mouse died in 78 days after the tar had been stopped. The carcass had been eaten by the other mice and no histological examination was possible.

Malignant Tumours.

1. Tar applied for 5 months. During the last month the skin was very rough, and in the last 13 days two warts made their appearance. When the tar was stopped the larger was the size of a hempseed and the smaller less than half of that. Another papilloma, hempseed in size, appeared 20 days afterwards. At the end of a month there were three horns with doubtful induration beneath. The horns became flatter but the induration proceeded, and at the end of 43 days it seemed definitely to be malignant. The tumour became fixed to the deeper tissues. When the mouse died after 60 days it had a horn, five-eighths of an inch high, set on a broad indurated base. Histological examination proved the tumour to be a squamous-cell carcinoma spreading laterally in the subcutaneous tissues and infiltrating the muscles (Plate I, Figs. 1 and 2).

2. Tar had been applied for 5 months. A tumour arose during the last month, and formed a horny pedunculated wart about the size of an oatseed, with a tiny wart behind it, when the tar was stopped. Fifteen days afterwards three or four minute warts appeared in the neighbourhood. Progress was slow. At the end of 2 months there was an area of induration detectable at the edge of the warty masses. The growth thereafter was rapid, and the mouse died in 81 days with a warty mass which on the deep side was infiltrating the muscles of the back (Plate I, Figs. 3 and 4).

3. Tar had been applied for 4 months, and on its cessation there was found a hemispherical subcutaneous tumour with a central eschar measuring a quarter of an inch in diameter. It had not been observed 8 days previously. It reached a diameter of nearly half an inch 20 days after the tar had been stopped, and it showed central ulceration. The mouse died in 25 days, and microscopic examination showed the tumour to be an epithelioma infiltrating the muscles. This tumour was of rapid growth, extending over little more than a month, and may have been malignant even at the time when the tar was stopped.

4. Tar had been applied for 4 months. Within the last 20 days a wart appeared, and by the time the tar was stopped it had reached the size of a hempseed. It had increased 20 days later, and two smaller warts appeared in the neighbourhood. Progress was rapid. The mouse died in 24 days, and microscopic examination showed an epithelioma infiltrating the muscles (Plate I, Fig. 5).

5. Tar had been applied for 4 months, and a wart the size of a milletseed had then been in existence for 8 days. It decreased somewhat 20 days after the tar was stopped. At the end of a month the top of the wart was accidentally removed. In 43 days there was a flat ulcer with slight induration. Progress was then slow. In 76 days there was a red ulcerated area with exuberant growth in the centre, and the condition was now considered to be malignant. In 86 days the ulcer had scabbed over, the induration seemed less marked, and two small warts had appeared in the neighbourhood. The mouse died next day. Histological examination showed an epithelioma penetrating the deep muscles (Plate I, Fig. 6).

6. Tar had been applied for 4 months; a small wart appeared during the last 8 days and had grown to the size of a small hempseed when the tar was stopped. Twenty days afterwards there were two small warts and two flat scab-covered areas measuring three-eighths and a quarter of an inch in diameter respectively, and beneath these there was some irregular induration. This induration by the end of a month had spread underneath the adjacent warts. These warts lost their prominence as the induration extended, so that in 43 days a raised indurated area obscured their position. At the end of 7 weeks there was an extensive indurated area nearly three-quarters of an inch in greatest diameter, with two ulcerated patches on its surface, and it was now considered indubitably to be malignant. The mouse died in 63 days, and the carcass was eaten by the other mice, and therefore the histological confirmation is awanting.

These experiments show that some warts will disappear, some will increase for a time and then diminish and disappear, some will increase but still remain simple, and others will go on to malignancy probably as rapidly as if the irritant had continued. We can make three deductions from this: (1) that the production of the cancerous state is not necessarily the result of the action of the irritant on neoplastic, as contrasted with pre-neoplastic, tissues; (2) that the bias towards malignancy is given to the cells probably during the pre-neoplastic stage; and (3) that the successful transplantation of a tumour in the histologically doubtful stage is not a sure proof of the malignancy of the tissue at that particular date, seeing that left alone in its natural environment it will tend to declare itself as an epithelioma.

Such conclusions would be rendered much more certain by observations in cases where the irritant had been suspended before any neoplastic reaction had taken place—that is, during the prodromal period. Cases are known where men have been exposed to the action of soot, paraffin, or aniline products for a length of time and have given up such employment, and yet years afterwards they have developed the particular kind of epithelioma associated with these irritants. These cannot be lightly dismissed as strange coincidences, and they would seem to show that the essential damage to the tissues, finally resulting in malignant proliferation, is done at a comparatively early stage.

A second batch of mice was taken which had been painted thrice weekly with tar for four or five months without any sign of tumour formation resulting, and the tar applications were stopped.

Result when Tumours were not Present.

At the time the tar painting was suspended there were 20 mice with no visible sign of neoplastic reaction. Of these, 6 remained negative till they died, 4 developed temporary warts, 4 developed simple papillomata, and 6 developed malignant tumours. The 6 negative cases lived for 29, 42, 43, 48, 65, and 75 days respectively after the tar was discontinued, and no sign of tumour was at any time observed.

Temporary Tumours.

1. Tar applied for 4 months. Twenty days afterwards a pinhead-sized wart was seen. This had disappeared a week later, and the mouse died in 63 days without further wart formation.

2. Tar applied for 4 months. A month afterwards a wart the size of a hempseed was found. This made slow progress for another month and then disappeared. The mouse died in 83 days without further wart formation.

3. Tar applied for 4 months. Two months later a tiny wart was found amidst the regrown hair. This persisted unchanged for nearly a month, then diminished in size and disappeared completely at the end of 100 days. The mouse died in 110 days without further wart formation.

4. Tar applied for 4 months. Twenty days afterwards a wart the size of a pinhead was found. It did not increase appreciably in size, and had disappeared when the mouse died in 48 days.

Simple Papillomata.

1. Tar applied for 4 months. The hair grew again. Forty-three days afterwards a small, flat, pinhead-sized wart was noticed. For another month its progress was slow. In 86 days it was just palpable, having diminished for 10 days. A fortnight later it developed into a cutaneous horn. The mouse died in 112 days. Histologically a typical papilloma.

2. Tar applied for 4 months. Twenty days later a wart the size of a large hempseed was observed. This increased slowly till the mouse died in 42 days.

3. Tar applied for 4 months. Twenty days later two small warts were seen, one the size of a hempseed, the other of pinhead size. A week later the smaller had disappeared and the larger had grown no bigger. Progress was very slow. The mouse died in 63 days.

4. Tar applied for 4 months. Twenty days later four minute warts were found. Two of these coalesced a week later. Progress of all very slow. The mouse died in 42 days.

Malignant Tumours.

1. Tar applied for 5 months. The skin was rough when the tar was stopped, but the hair grew again. A month afterwards the skin was very rough and scabby. In 38 days there was doubtful growth under a scab which was pulled off. In 45 days there was definite horn formation, with doubtful basal induration. By the end of 2 months tumour formation had progressed, but the induration was still doubtful. The horn was broken off in handling. The mouse died in 71 days, and histological examination showed the tumour to be a large cornifying epithelioma definitely infiltrating the deep muscles of the back.

2. Tar applied for 4 months. Twenty days later a tiny wart was noticed. At the end of a month another wart appeared, and the first had grown to the size of a hempseed. In 43 days several warts were seen, one of them growing very well. At the end of 2 months progress had been maintained and induration of the base was suspected. A week later this induration was marked and the diagnosis of epithelioma was practically certain by 76 days. The mouse died in 98 days. Microscopic examination showed an epithelioma (Plate I, Figs. 7 and 8).

3. Tar applied for 4 months. Twenty days later there was found a wart the size of a hempseed with two tiny warts in front of it, all surrounded by hair. At the end of 27 days the larger had reached the size of a small pea. For another week it was stationary, though the base seemed somewhat indurated. Superficial ulceration commenced in 43 days and the basal induration extended. Another small wart now appeared. Five days later necrotic material was expressed from under the larger wart, and by the end of 63 days there was merely a flat scab half an inch in diameter, and it was thought that the greater part of the process must have been inflammatory and not malignant. The mouse died in 70 days, and histological examination showed an epithelioma of atypical cells deeply infiltrating the muscles.

4. Tar applied for 4 months. Twenty days later a hempseed-sized wart was observed. It increased in size and in 38 days another wart appeared beside it. Progress was then slow. In 70 days it was thought that the base of the larger showed signs of induration, but as the growth was very slow and the induration did not extend doubt remained until the mouse died in 90 days. Histological examination proved it to be an epithelioma with epithelial cell masses penetrating beyond the panniculus carnosus.

5. Tar applied for 4 months. The skin was then bald but smooth. From the 20th to the 34th day afterwards the skin was rough but again became smooth. In 63 days a small wart was detected. This increased in size and the skin grew rough. In 76 days there were two warts in this rough area. These progressed in size and the whole skin showed a verrucose appearance. The mouse died in 96 days. Microscopic examination revealed an epithelioma just penetrating the panniculus carnosus (Plate I, Fig. 9).

6. Tar applied for 4 months. One month afterwards minute raised points, hardly to be called warts, were found. A week later they might have been described as tiny warts set closely in a rough scaly skin. In 43 days they had coalesced to form a flat wart. Five days later serous fluid exuded from it and a crusted area took the place of the flat wart. In 63 days blood-stained serum exuded from this, and three small warts made their appearance. Sepsis became evident, and the resulting ulcer was taken to be merely a septic condition until the mouse died in 86 days, when microscopic examination revealed a typical epithelioma invading the deep muscles of the back (Plate I, Fig. 10).

These experiments clearly show that when tar has been applied repeatedly for a certain length of time and the irritant is then removed, tumours, even carcinomata, may make their appearance at a later date. It must be that the irritation produces in the normal cells subjected to its influence some profound change, undetectable by the microscope, so that they eventually proliferate in an unrestrained and in a harmful fashion. We may conclude that the neoplastic response to an irritant is a slow tissue reaction that exhibits no defensive property, that subserves no useful function. The internal changes in the cells in the earliest stages may some day be analysed: at present they are quite unknown. In the skin epithelium we have a tissue which we have been taught to believe is constantly being shed and constantly regenerated, and one would imagine that the damaged cells would soon have been shed leaving a new and healthy race to take their place. Of course, in man the processes take a much longer time to evolve. In mice we can discover the minimum duration of exposure to a tissue irritant that will be necessary to produce cancers, and thus form an idea of the length of the latent period before they are evident, and it is possible that this will vary with different agents.

REFERENCE.
[1] *Journ. of Cancer Research*, 1918, vol. 3, No. 1, p. 1.

NINETIETH ANNUAL MEETING
OF THE
British Medical Association.
Held at Glasgow, July, 1922.

PROCEEDINGS OF SECTIONS.

SECTION OF PATHOLOGY (HUMAN AND COMPARATIVE).

Professor ROBERT MUIR, M.D., F.R.C.P.Edin., F.R.S., President.

THE PRODUCTION OF CANCER BY SPECIFIC FORMS OF IRRITATION.

BY
J. A. MURRAY, M.D.,
Imperial Cancer Research Fund, London.

THE modern experimental study of cancer etiology begins with Fibiger's experiments with the Spiroptera cancer of rats. The specific irritant is introduced by feeding rats with cockroaches carrying the larval nematodes. The cycle is completed by feeding cockroaches with the faeces of infected rats. Squamous carcinoma of the rat's stomach and tongue follows in a variable percentage of animals. Some races of rats are apparently quite resistant, and never show any lesions graver than papillomatous thickening of the gastric mucosa. Analogous results have been obtained by feeding rats with ova of *Taenia crassicollis* from infected cats. In this case sarcoma of the liver is obtained in as many as 50 per cent. of young rats (Bullock and Curtis). Both methods are convenient in application, but have the disadvantage that the animals have to be killed to observe the result.

The external application of coal-tar, first successfully utilized by Yamagiwa and Ichikawa on the rabbit's ear, though much more laborious, permits continuous observation and experimental variation in the degree of irritation. The extension of this method to the mouse by Tsutsui, and later by Fibiger and Bang, Murray and Woglom, Bloch and Dreyfuss, Deelman and others, has put us in possession of a certain method of producing undoubted malignant growths (squamous-cell carcinoma) in a high percentage of the animals used. This is evidenced by progressive growths, local infiltration, and lymphatic and vascular dissemination. In addition, Murray and Woglom have shown that artificial metastasis can be carried out with these growths. In this way very strong evidence of their malignancy can be got at an early stage, before even local infiltration has had time to occur.

So far an interval of at least three months has elapsed before true malignant growth occurs, and in some animals tarring must be kept up for as long as eighteen months to produce this result. No one has succeeded with the rat or guinea-pig, and it is probable that success with the mouse is, in part at least, to be attributed to the short life cycle of that animal. The surmise is borne out by the fact that in tar distillers and pitch workers the interval is never less than ten years, and may extend to thirty and forty years before malignant disease is set up. These observations furnish a rational explanation of the characteristic age incidence of cancer, since it is probable that the irritational factors responsible are neither so continuously nor so energetically applied in these industrial forms of the disease as in the experiments with mice.

Bloch and Dreyfuss are of opinion that the active substance is contained in the anthracene fraction of coal-tar boiling at over 300° C. I have found that an extremely active extract can be prepared from tar by successive extractions with water, alcohol, and ether. The ethereal extract gave 50 per cent. malignant growths in twelve months, reckoned on the total number of animals which survived for four months.

Result of an experiment in which unaltered tar, alcoholic extract, and ethereal extract of tar were applied to separate areas of the dorsal skin of each of 60 normal mice. After four months, when the first tumour appeared, 50 mice survived, and

in these 25 presented malignant new growths distributed as follows:

No. of Mice.	Tar.	Alcoholic Extract.	Ethereal Extract.	
11	−	−	+	22
10	+	−	+	
1	−	+	+	
2	+	−	−	
1	−	+	−	
25				

Twenty-two out of 25 animals bore carcinomata at the site painted with the ethereal extract, 12 had carcinomata at the site treated with the original tar, and 2 only at the site treated with the alcoholic extract. In one of these animals no tumours appeared at the sites treated with the apparently much more efficacious whole tar and ether extract.

The alcoholic extract only produced two new growths in the same series of animals, but other experiments raise the suspicion that this does not truly represent the power of the alcoholic fraction to produce cancer. The other experiments were carried out by tarring animals, which had already responded to tarring with carcinoma production, in another situation remote from the area in which the first growth was produced. So far no second initiation of cancer has been observed, although in several instances tarring has been continued for longer periods than were required the first time. Mice which had developed spontaneous mammary carcinoma have been operated and tarred for long periods without success, and the two sets of experiments seem to indicate that the previous existence of a cancerous growth may in some way hinder the production of a second primary tumour. Further experiments are in progress to test this possibility in unequivocal fashion, as it is obvious that, if proved, it furnishes an explanation of the rarity of multiple primary growths, and may lead to a rational diagnosis and prophylaxis of malignant disease.

PARAFFIN CANCER AND ITS EXPERIMENTAL PRODUCTION.

BY

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[*With Special Plate.*]

ABOUT the middle of last century the distillation of paraffin oils from the oil-bearing shales that exist in the West Lothian district of Scotland was begun, and the methods now employed universally in the refining of mineral oils originated there. The shale, as it is brought up from the mines, is a hard, black, non-crystalline substance which roughly resembles lumps of pitch. Heated in tall high-temperature retorts, it yields a dark viscid fluid, from which ammonia, naphtha, lubricating oils, illuminating oils, and solid paraffin are obtained by subsequent refining processes. The workmen engaged in the treatment of the cruder products are prone to various skin eruptions, affecting principally the arms, which are directly exposed, and also other parts, especially the scrotum, through their oil-sodden clothing. These skin affections comprise acute paraffin dermatitis, which most of the workers develop within a few days of starting employment, more chronic conditions which make their appearance later and may persist for years, and finally papillomata and true epitheliomata.

The occurrence of cutaneous cancers of the arms and scrotum in paraffin workers has been well recognized for over fifty years by medical men practising in that district of Scotland, though few of them have recorded their observations in medical journals. Ogston,[1] from his examinations of workmen employed in a small paraffin refinery in Aberdeen, was the first, in 1871, to publish an account of acute and chronic paraffin dermatitis, but his description was necessarily incomplete, though it is still worth reading if only to admire the beauty of his literary style. The first actual record of paraffin cancer, however, is to be found in a paper by Volkmann,[2] who in 1875 reported three cases of cancer of the scrotum. The distillation of lamp oils from the German brown coal—a mineral closely allied to shale chemically and geologically—had then been in operation in the neighbourhood of Halle for some fifteen years. Indeed, all the cases of paraffin cancer recorded in German literature—and they are few—have occurred in that locality, whilst all the cases recorded in English have come from the above-mentioned part of Scotland. It is possible that as the refining centres for crude petroleum multiply in this country we may encounter more cases unless special precautions are adopted. As far as I know only two cases have been reported from such refineries in the United States. In 1876 Joseph Bell of Edinburgh[3] (the prototype of "Sherlock Holmes"), unaware of Volkmann's communication, published a description of two cases of paraffin cancer. A case under the care of Hector Cameron of Glasgow was recorded in 1879, and his reporter noted that this was Cameron's third case, and stated that Longmuir and other practitioners in the Scottish shale country had long been familiar with the condition.[4] The literature on the subject is meagre: Tillmanns of Halle in 1880,[5] Longmuir of Bathgate in 1883,[6] Schuchardt of Halle in 1885,[7] George Buchanan of Glasgow in 1894,[8] Kirk of Bathgate in 1903,[9] and Franklin Davis of Chicago in 1914,[10] are the only others who have recorded cases. The total number of cases in the literature, excluding the frequent repetitions of the same cases in Germany, is less than a score, although undoubtedly many more cases have occurred. Dr. Alexander Scott of Broxburn has had an unrivalled experience of paraffin cancers, and we look forward to his communications.*

Some interesting facts emerge from a consideration of these cases. The subjects have been long exposed to the action on the skin of crude mineral oils, and though we refer to the lesions as "paraffin cancers" it is by no means certain that the particular harmful agent in the oils is a member of the paraffin series: both shale and German brown coal yield, in addition, olefines, naphthenes, aromatic compounds, and a host of other chemical substances in lesser amounts. The workers in the refineries who deal with solid paraffin or with the more refined oils are not prone to dermatitis or cutaneous tumours. But whatever the chemistry of the substances may be, we have in crude paraffin oils something that induces neoplasia. The skin cancers that they produce are all of an exactly similar type; they occur on sites unusual for squamous carcinomata unassociated with definite forms of irritation; they are frequently multiple; they are generally preceded or accompanied by warts or other hyperplasias; they are often of a low degree of malignancy; and it takes several years of exposure to the noxious substances before they develop—never less than ten years in the German industry and probably never less than fifteen in the Scottish oil works. Although the patients are usually of middle age or more, it is perhaps more a question of the length of exposure than of the age of the individual. Can we say that the substances under consideration are the actual cause of the epithelioma? The generally accepted opinion has been to regard them as mediate or predisposing rather than as proximate causes: they bring about such a pathological condition of the skin that the soil is rendered suitable for the operation of some other and hitherto mysterious cause. It is impossible to controvert such an idea. But the success that has attended our efforts to produce cancer experimentally minimizes its cogency. No one doubts that the crude paraffin oil produces chronic as well as acute inflammatory reactions; no one has doubted the fact that it causes hyperplasias of the epithelium and even definite wart formation; why should one have to premise the intervention of a new factor in the succeeding development of the malignant stage?

In our previous experiments with coal tar we found, as other workers have found, that it was comparatively easy to induce cancer formation in mice by continuing the applications to the same area of the skin for several months. Generally, though not invariably, the epitheliomata passed through a preliminary stage of benign papilloma, and if the animals lived long enough they all developed malignant tumours. We wished, therefore, to see if we could obtain similar results by the use of shale oil. Thanks to the kind offices of Dr. Scott and the courtesy of the Pumpherston Oil Company and their chief chemist, Mr. E. M. Bailey, I obtained samples of the more unrefined oils, and the experiments were started in September of 1921. Four crude products were used, known as "green oil," "blue oil," "unfinished gas oil," and "unfinished lubricating oil"—representing a series advancing in purity, from each of which solid paraffins in decreasing amounts may be obtained. All these were applied by means of a camel-hair brush to a small area between the shoulders three times a week for several months, but naturally the oil diffused through the hair and affected a much greater area. This was an undesirable but unavoidable occurrence,

* See p. 1108 of this issue, and also p. 381, August 26th, 1922.

for the animals licked some of it off and we lost a large number of mice in consequence. At a later date we used rats, cavies, and rabbits in addition, but hitherto no tumours have been obtained in these animals. After one or two applications the hair falls out over the area affected; generally after some weeks it grows again, but by continuing the applications it becomes permanently lost, leaving a bald, shiny area of skin. Sometimes this bald skin shows a slight scaly eczema, and in a few animals there are small points of excoriation due to scratching, but in no cases have we ever found acute or chronic dermatitis of the types found in the human subject. Occasionally we have observed minute skin plaques, probably representing local hyperplasia of the epithelium, which have immediately preceded wart formations; at other times they seem to have disappeared spontaneously. By the end of the third or the beginning of the fourth month papillary upgrowths may be expected to make their appearance, increasing in size and number, generally forming extremely keratinized warts or horns, and progressing in the course of time to squamous-cell carcinoma.

Experiments with "Green Oil" (Fraction A).

This is a dark, thick, viscid fluid which contains a considerable amount of semi-solid paraffin in suspension. The crude distillate that comes from the retorts is treated with sulphuric acid and soda and again distilled, and the product is the first with which the workmen come in contact. A series of 100 mice was used. At the end of a hundred days only 29 remained alive; of these, 16 never developed tumours, 4 exhibited small warts which subsequently disappeared, 8 developed simple increasing papillomata, and 1 developed a malignant tumour.

Negative Cases.

The animals lived for periods lasting for 105 to 175 days. Histological examination of the skin showed extensive destruction of the hair follicles, irregular hyperplasia of the epithelium, often hyperkeratinization, and, not infrequently, round-cell infiltration of the cutis with increased vascularity. A common feature in these, as in many of the animals that died later, was an extreme degeneration of the liver parenchyma.

Temporary Tumours.

It was probable that in the majority of cases the small warts were scratched off by the animals themselves; possibly they sometimes disappeared spontaneously.

1. Two minute warts were formed in 98 days, but they disappeared within a fortnight, and there was no sign of tumour formation when the mouse died in 144 days.
2. A small wart was detected in 111 days, but no trace was left 16 days later, and the mouse died in 139 days without sign of tumour.
3. A papilloma appeared in 111 days, and a second in 127 days. The growth of both was very slow. The second had gone in 147 days and the first in 172 days. The mouse died in 180 days without sign of tumour.
4. Two warts were seen in 117 days, a third appearing in 140 days and a fourth in 147 days. In 172 days three of these had disappeared, and the fourth had gone in 181 days. The mouse died five days later with no visible tumour.

Increasing Papillomata.

The first tumours in all cases made their appearance before the end of twenty weeks, but their rates of growth varied considerably.

1. A wart was noticed in 98 days; in 111 days there were four warts, in 117 days five, and in 127 days six. The mouse died in 133 days. Microscopic examination showed multiple, strongly keratinized papillomata with hyperplasia of intervening skin and complete destruction of hair follicles.
2. Two warts were evident in 98 days; in 117 days there were five warts altogether. The mouse died in 141 days. Microscopic examination showed keratinizing papillomata with irregularity of adjacent epithelium.
3. Two warts were observed in 98 days. The animal died in 109 days and microscopic examination showed a branching papilloma with dilatation of the vessels of the corium.
4. Two warts were noted in 98 days. One remained a flat wart and the other formed an upstanding horn. Several more appeared in 147 days. The animal lived for 155 days. The tumours were simple papillomata.
5. The first wart was found in 98 days and another appeared in 111 days. In 140 days there were two large and several small warts and the number and size had increased in 147 days. The animal died in 166 days. Multiple benign papillomata.
6. A wart started in 140 days and had formed a thin tall horn when the mouse died in 155 days.
7. A small papilloma appeared in 111 days, but its progress was very slow, and it had only attained the size of a hempseed when the animal died in 163 days.
8. A single papilloma was noticed in 111 days, three in 127 days, and three or four more in 140 days. In 147 days the two largest had coalesced. There was marked horn formation in 153 days, and the oil applications were then stopped. Progress was maintained; in 158 days there were four large horns. The oil was resumed in 214 days, but without any resulting acceleration of growth. The animal died in 268 days with comparatively huge multiple horny papillomata that showed no basal induration. No microscopic examination of the tumours was made as the specimen was required for other purposes, but it is probable that they were all still in a benign stage (Plate II, Fig. 1).

Malignant Tumour.

This was the first animal in this series to develop a tumour. In 87 days two small warts were found; in 111 days another appeared, and in 140 days there were seven warts altogether (Plate II, Figs. 2 and 3). In 181 days there were three large papillomata and one smaller on the back and another two on the left side (Fig. 4). Under the lower of the last two there was a suspicious basal induration. The oil applications were therefore stopped on this day. The suspicious patch of induration became more definite; it undermined the neighbouring small wart, and the two warts were lost by superficial ulceration. In 200 days this indurated area, raised from the surface and superficially ulcerated in the centre, was a good half-inch in diameter. The animal died in 206 days (Fig. 5). Microscopic examination of one of the horny warts on the back showed advanced papilloma, with considerable irregular downgrowth of the epithelium. It was impossible to say whether it was simple or benign; the fibres of the panniculus carnosus could not be found beneath the downgrown epithelium, but, judging from the position of remnants of that muscle on either side, it had not penetrated beyond that level; and if we take penetration of the panniculus as the histological criterion of malignancy we shall have to record this as a doubtful tumour (Fig. 6). But the ulcerating tumour on the side was of a different character; it was a spindle-cell sarcoma which infiltrated the deep muscles (Fig. 7). No metastases were found in the internal organs nor in the lymphatic glands.

Experiments with "Blue Oil" (Fraction C).

This substance differs from "green oil" only in the fact that it contains less of the solid and semi-solid paraffin, which has been removed by refrigeration. The workmen at the presses are continually in contact with this crude oil. In the experiments a series of 100 mice was used. At the end of a hundred days only 22 mice were alive; of these, 9 remained negative, 1 showed a temporary tumour, 10 had increasing papillomata, and 2 developed malignant tumours.

Negative Cases.

The animals lived for periods lasting for 111 to 281 days. It is remarkable that one mouse survived the thrice-weekly applications for over nine months without at any time showing any neoplastic reaction. The microscopic examination of the skin of these mice showed appearances identical with those in the negatives of the former series.

Temporary Tumour.

On one mouse which remained refractory for a long period a small wart arose in 186 days, but it never increased above the size of a pinhead. It had disappeared when the mouse died in 200 days, and histological examination of the site it occupied showed merely a healed scar.

Increasing Papillomata.

The tumours appeared in from three to six months and showed various rates of progress.

1. Three warts were observed in 98 days: in 111 days two of these had increased, but one remained stationary. The progress was now slow. In 140 days there was only one good wart. In 147 days another had just appeared. In 147 days there was a good-sized flat wart which in 181 days measured 7 mm. by 5 mm. The mouse died in 186 days. Microscopic examination showed a simple papilloma.
2. In 98 days a wart was seen which by 111 days had reached the size of a large hempseed. In 117 days another wart appeared beside it. These went on increasing and coalesced to form a good-sized flat wart in 140 days, at which time another smaller wart appeared. All progressed till the animal died in 164 days.
3. A small wart appeared in 98 days; in 111 days there were two papillomata growing well; in 127 days these had formed two adjacent horny warts; in 147 days these two upstanding horns were separated only by a very narrow cleft, and a third wart appeared beside them. Gradually all three coalesced to form one large horn. The mouse died in 179 days. Histological examination showed an excessively keratinized papilloma with downgrowth of epithelium which reached but did not actually invade the panniculus carnosus.
4. A small wart was seen in 98 days, which reached the size of a hempseed by 110 days, when the animal died.
5. In 98 days a wart appeared which grew till the animal died in 111 days. Microscopic examination showed a small branching papilloma which was markedly cornified. The tissues of the corium, the panniculus carnosus, and even the subjacent muscles, were domed upwards towards the stalk of the papilloma. The hair follicles in the vicinity were lost, and there was no evidence of round-cell infiltration in the corium.
6. A small wart was discovered in 111 days; in 127 days it had formed a tall, slender, horny papilloma; in 140 days it had grown larger, and a second but flatter wart had appeared. The mouse died in 144 days. Microscopic examination showed a simple papilloma with considerable hyperplasia of the epithelium in the neighbourhood.

7. Only at the end of 140 days was a small pinhead-sized wart discoverable, but this showed progressive growth till the animal died in 172 days.

8. In 140 days a very small pointed wart made its appearance on the right posterior part of the exposed area. In 147 days other two small warts appeared on the opposite flank, and these coalesced in 181 days. In 186 days there were three warts, one on the right flank, one on the left flank, and one on the right shoulder. In 201 days there were two warts on the left flank and one on the right, but the wart on the shoulder had disappeared. Progress was now very slow. The mouse died in 236 days with three fairly large, and several small, horny warts. Microscopically they were simple papillomata.

9. The first sign of a wart was not seen for 172 days. Its succeeding progress was very slow, and it never exceeded 2 mm. in diameter. It disappeared entirely in 201 days. A second small wart appeared at another situation and measured 1.5 mm. by 2 mm. in 214 days. The mouse died in 222 days. Histological examination showed a small but typical cornifying papilloma.

10. Not until after 181 days did a minute wart make its appearance. The progress was exceedingly slow. In 294 days it had formed a little horny papilloma about an eighth of an inch in height. The mouse died in 299 days. Histologically it was a simple wart, but it was remarkable that the adjacent epithelium showed neither hyperplasia nor irregularity.

Malignant Tumours.

1. The earliest tumour formation in any of the oil experiments occurred in this animal. In 83 days there was found a spherical semi-sessile wart of the size of a hempseed. By 111 days it had shown considerable increase. In 117 days there were three papillomata; in 127 days several minute thickened plaques of skin were also evident; in 140 days there were five separate papillomata, and another had appeared in 147 days. Increase in size was very slow now for a long time (Plate II, Fig. 8). Thus in 201 days there were still six papillomata. In 208 days another wart appeared on the right foreleg. In 214 days it was thought that there might be basal induration of one of the warts situated on the neck behind the left ear (Fig. 9). The other warts were then short and not progressive. In 247 days it was certain that the tissues under the post-aural wart were being infiltrated; in 257 days the subcutaneous infiltration extended under the skin of the ear; in 264 days this tumour showed cracks on its surface and it was infiltrating subcutaneously towards the occiput. Another smaller wart situated over the left shoulder showed suspicious basal induration. Besides these there was a good horn in the mid-line, a wart over the right shoulder, and three other flat warts on the back. The animal was killed on the 265th day (Fig. 10). Microscopic examination of the post-aural tumour revealed an epithelioma with somewhat atypical cells and comparatively little keratinization; the tumour cells infiltrated the deep muscles (Fig. 11). The smaller tumour situated over the left shoulder was also an epithelioma infiltrating the muscles, and it was entirely separate from the former. Thus there were two distinct epitheliomata produced in this mouse. No metastases were seen.

2. In contrast to the last case, no lesion of any kind could be detected before 186 days, when a very doubtful minute plaque was seen behind the left ear, but this had disappeared entirely within a fortnight. In 208 days a tiny wart was noticed in the mid-line behind the shoulders, but it did not increase in size. In 228 days a small wart appeared behind the left ear; in 239 days it had shown little or no progress, and the wart in the mid-line had disappeared. In 264 days the post-aural wart measured less than a quarter of an inch in diameter and in height; in 295 days it was no larger than a hempseed, though it grew later into a horn which curled towards the mid-line, and the base indurated shortly before the animal died in 339 days (Plate III, Figs. 12 to 14). During manipulation at autopsy the horn was broken off, leaving an area of basal induration. No metastases were seen. Histological examination of the basal part showed, to our surprise, a spindle-cell sarcoma infiltrating the deep muscles (Fig. 15). The surface of this where the horn had been detached was covered by a rather indefinite hyaline material, but the surface epithelium on either side of this was not much altered. Examination of the broken-off horn showed the usual highly cornified epithelium. There was no transition between the epithelial cells and the underlying sarcoma. The picture, including the superficial hyaline material which I take to represent degenerated keratin, was identical with that given by the sarcoma produced by the "green oil" above.

Experiments with more Refined Shale Oils.

From "blue oil" which has been treated with sulphuric acid and caustic soda and then distilled three products are obtained—unfinished gas, cleaning, and lubricating oils. I am not aware that cutaneous cancers have developed in workmen dealing with these products. Two series of fifty mice were painted with unfinished gas oil and unfinished lubricating oil. These were started in the beginning of this year. The death rate, as with the cruder oils, has been very high, and as the experiments are still going on only an imperfect account can be given. With both substances we have succeeded in producing tumours.

Unfinished Gas Oil.—With this oil, which is a golden-yellow transparent fluid, but from which solid paraffin can still be extracted, only one temporary tumour was obtained amongst 13 mice which had survived for a hundred days.

A papilloma was observed in 102 days, and it reached the size of a hempseed in 110 days. Its progress was slow. In 135 days it had been scratched flat. In 145 days it had gone, leaving a small excoriated area. In 152 days there was another wart on a different site measuring 1 mm. thick and 2 mm. in height; in 180 days it had grown laterally somewhat but had not increased in height, and it slowly disappeared.

Unfinished Lubricating Oil.—This is a dark green oil still containing solid paraffin in solution. With this three tumours have been produced amongst 10 mice which survived for a hundred days.

1. Two minute warts close together were found in 124 days, but they were still small when the mouse died in 183 days.

2. A tiny wart was discovered in 180 days, but it disappeared entirely. Another started in 255 days, and measured 2 mm. high by 1.5 mm. broad a week later. The mouse is still alive.

3. A small papilloma appeared in 123 days, and had reached the size of a lentil 12 days later. In 145 days there were three separate warts which showed fair growth (Plate III, Figs. 16 to 18). When the mouse died in 235 days it showed three tumours—one a large horn about three-quarters of an inch long growing from the back of the neck, a small wart about the size of a hempseed, and a circular superficially ulcerated infiltrating tumour on the left flank. Microscopic examination of the last tumour showed it to be a typical epithelioma infiltrating the deep muscles (Fig. 19). No metastases were seen.

[The dates for the appearance or disappearance of tumours in all the experiments are correct to within seven days.]

By the frequent application of crude shale oils containing paraffins we have thus produced tumour formations in no less than 30 out of 74 mice which survived the treatment for over a hundred days. Owing to the increasing death rate after that time it is impossible to say how many more would have developed tumours had they lived long enough, or how many of the simple tumours produced would have gone on to malignancy. Certainly one animal resisted for over nine months. The disappearance of some of the simple papillomata corresponds with what is found in man. In many of the older papillomata considerable difficulty has been encountered in forming a judgement of their benignity or malignancy; the boundary line between them is nebulous, and I have adopted the convention of not reckoning a tumour as malignant no matter how extensive the heterotopy of epithelium or the lack of differentiation of the cells, unless the panniculus carnosus has been definitely penetrated. I have not used the method of transplantation as a criterion of malignancy because I do not believe it gives any surer, or even additional, information on that point. But in the two epitheliomata I have produced the invasion has gone far deeper than the panniculus carnosus and the evidence, even though metastases have not occurred, is clear beyond doubt. The sections of the two sarcomata have been seen by several pathologists of distinction, and all agree with the diagnosis. It might be thought that the cells composing these latter tumours are much altered, undifferentiated epithelium, but careful examination and the use of special staining methods seem to put this interpretation out of court. The sarcomatous development which in these two cases occurred underneath previously existing papillomata is probably due to the entrance of the carcinogenic agent into the subcutaneous connective tissue through small fissures in the overlying epithelium. Sarcomatous formation has not been found in the workmen in the paraffin refineries, but the observation in mice is of interest in that it demonstrates that the same causal agent may produce two such widely different kinds of malignant tumours as epithelioma and sarcoma. If we reckon that the life of a mouse is roughly one-twentieth that of man and that its reactions, as far as neoplasia are concerned, are correspondingly speeded up, we may conclude from our experimental evidence that it takes at least ten years of exposure to paraffin oils to produce cancer in man—which corresponds to actual experience. And the result of our experiments, in which we have cut out as far as is humanly possible all the accessory factors that disturb the deductions in the human subject, goes far to show that we are dealing with an actual, in contradistinction from a predisposing, cause of cancer.

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LEITCH: EFFECT OF CESSATION OF IRRITANT ON DEVELOPMENT OF EXPERIMENTAL TAR CANCER.

FIG. 1.—Large horny wart with basal induration. Tar had been applied for 5 months, and for the last 13 days a wart was present. Photo on day before death, 60 days after cessation of treatment.

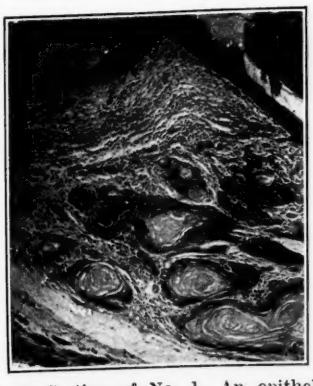

FIG. 2.—Section of No. 1. An epithelioma showing lateral subcutaneous spread. Muscle fibres were easily identified amongst the epithelial cell masses. Age of tumour 73 days.

FIG. 3.—Multiple cornified warts, the larger with deep infiltration. Tar applied for 5 months; tumour formation started at end of 4 months. Photo on day before death, 80 days after cessation of applications.

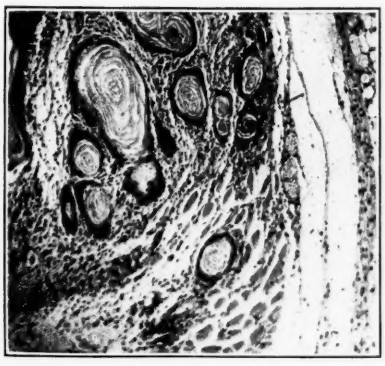

FIG. 4.—Section of No. 3—an epithelioma with large cornifying cell masses infiltrating the deep muscles of the back. Age of tumour 111 days.

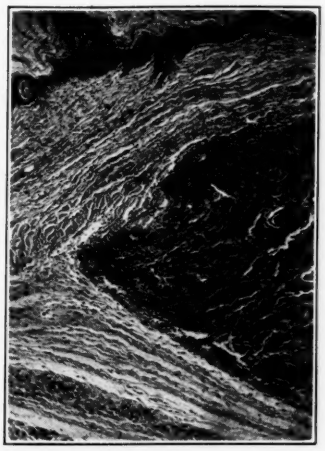

FIG. 5.—A very cellular epithelioma with little keratinization, spreading laterally beneath the panniculus carnosus, which may be seen crossing obliquely upwards from the middle of the left margin. Age of tumour 44 days. Tar applied for 4 months, and tumour started 20 days before cessation of applications.

FIG. 6.—An epithelioma infiltrating muscle, part of which is seen below. Age of tumour 95 days. Tar applied for 4 months, and tumour started 8 days before cessation of applications.

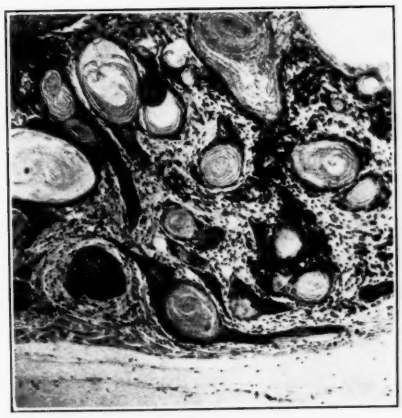

FIG. 9.—An epithelioma just penetrating the panniculus carnosus. Tar applied for 4 months. Tumour started 2 months later. Age of tumour 33 days.

FIG. 7.—Tar applied for 4 months. Tumour started 20 days later. Photo a week before death. A large cornified mass with basal induration.

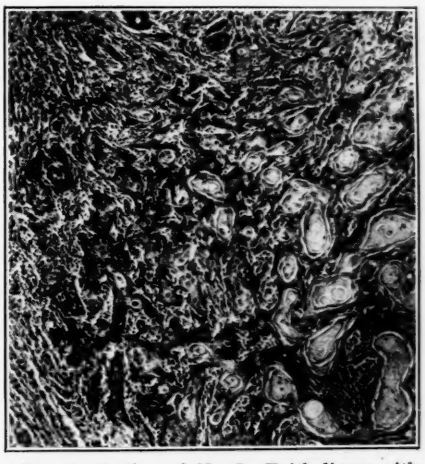

FIG. 8.—Section of No. 7. Epithelioma with moderate keratinization. Age of tumour 78 days.

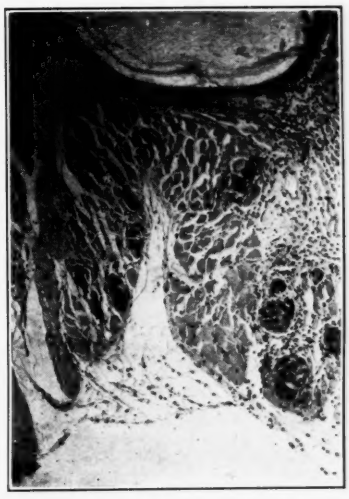

FIG. 10.—An epithelioma. Epithelial cell masses can be seen amongst the fibres of the deep muscles of the back. Tar applied for 4 months. Tumour started one month later. Age of tumour 55 days.

PLATE II.

LEITCH: PARAFFIN CANCER AND ITS EXPERIMENTAL PRODUCTION.

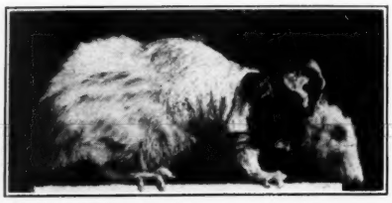

FIG. 1.—Large multiple horny warts over the shoulder region produced in 9½ months by applications of crude shale oil (fraction A).

FIG. 2.—Tumours produced by crude shale oil (fraction A). Warts on neck and left flank. Photo on 116th day.

FIG. 3.—Same mouse after 151 days. More warts on shoulder and much scaly dermatitis.

FIG. 4.—Same mouse after 177 days. View from right side.

FIG. 5.—Same mouse after death, 206th day. The large tumour on the left flank had developed within a month. Note the horny warts on the neck and shoulder.

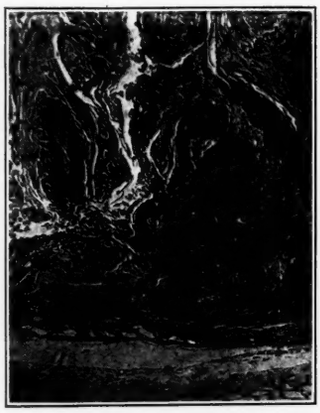

FIG. 6.—A section of the tumour behind the ears. Much downgrowth of proliferated epithelium reaching level of panniculus carnosus—a doubtful epithelioma. Age of tumour 119 days.

FIG. 7.—A section of the tumour on the left flank—a spindle-cell sarcoma. Low power photo. Compare with Plate III, Fig. 15. Age of tumour 25 days.

FIG. 8.—Tumours produced by crude shale oil (fraction C). Warts on neck and shoulder after 180 days.

FIG. 10.—The same after 265 days. The dorsum of the ear is infiltrated, and beneath this tumour there is another smaller tumour which shows basal induration.

FIG. 9.—The same after 212 days. Suspicious induration noted beneath the growth immediately behind the ear.

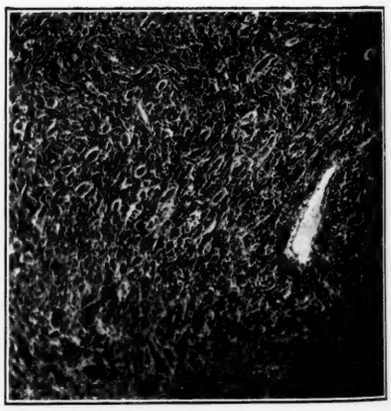

FIG. 11.—Section of the tumour infiltrating the ear—a very cellular epithelioma with very little keratinization. Remnants of muscle fibres can be detected amongst the invading cells. Age of tumour 151 days.

LEITCH: PARAFFIN CANCER AND ITS EXPERIMENTAL PRODUCTION.

FIG. 12.—Tumours produced by crude shale oil (fraction C). Photo of wart at base of left ear after 263 days.

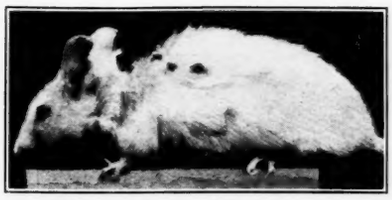

FIG. 16.—Tumours produced by more refined shale oil (fraction G). Warts after 170 days.

FIG. 17.—The same after 185 days.

FIG. 18.—The same after 225 days.

FIG. 13.—The same after 282 days, showing practically no progress.

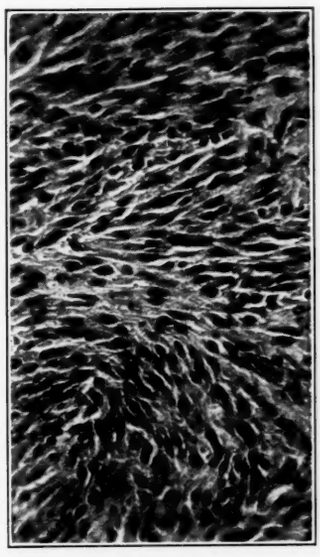

FIG. 15.—Section of tumour when mouse (Figs. 12, 13, 14) died on the 339th day. High power. It is a spindle-cell sarcoma similar to that in Plate II, Fig. 7. Age of tumour 111 days.

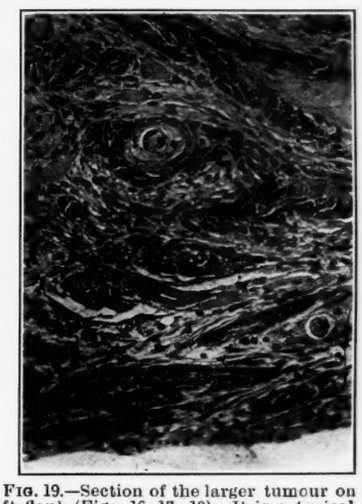

FIG. 19.—Section of the larger tumour on the left flank (Figs. 16, 17, 18). It is a typical epithelioma infiltrating the muscles, fibres of which can be detected amongst the epithelial cell masses. Age of tumour 112 days.

FIG. 14.—The same after 297 days, slightly larger.

PLATE IIIA.

LEITCH AND KENNAWAY: EXPERIMENTAL PRODUCTION OF CANCER BY ARSENIC.

FIG. 1.—Photo taken after death at the end of 5½ months, showing large tumour at back of neck with small wart in mid-line directly behind it.

FIG. 2.—The same from above.

FIG. 3.—Section of larger tumour showing typical cellular epithelioma on right side. On the left side may be seen the subcutaneous tissues with evidences of chronic inflammation. Age of tumour 76 days.

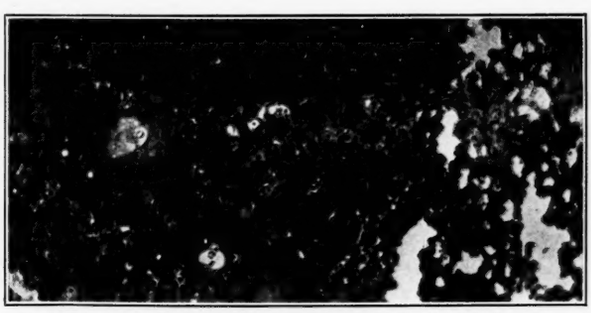

FIG. 4.—Section of the metastatic nodule in the left lung.

SCOTT: OCCUPATION CANCER OF PARAFFIN AND OIL WORKERS.

FIG. 1.—Recent papular dermatitis occurring after a few weeks' service in paraffin departments. This eruption had almost completely disappeared three weeks after its onset.

FIG. 2.—Advanced dermatitis erythematosa, after over twenty-four years' service as paraffin worker. Note warts, scars, scales, and patches of atrophied skin.

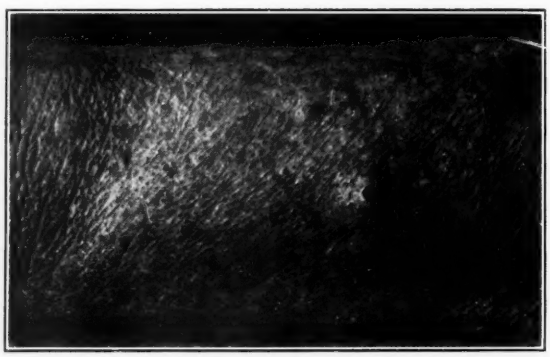

FIG. 3.—Horny papule in midst of indurated skin. Note leathery appearance of skin.

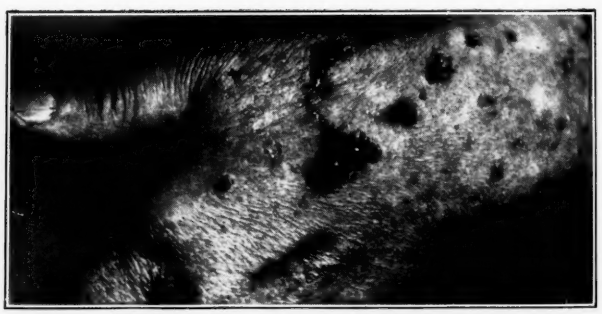

FIG. 4.—Horny warts on hand. Paraffin worker 83 years of age, sixty years' service as paraffin worker.

FIG. 5.—Large paraffin wart, with central necrotic area, approaching malignancy. Paraffin worker for thirty years.

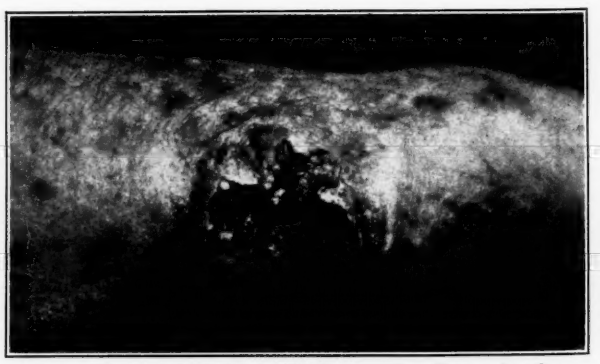

FIG. 6.—Large ulcerating epithelioma. Paraffin worker for over forty years.

EXPERIMENTAL PRODUCTION OF CANCER BY ARSENIC.

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[*With Special Plate.*]

A FEW cases had been recorded previously of epithelioma of the skin occurring in patients the subject of psoriasis without any definite relationship between the two diseases having been suspected. Jonathan Hutchinson was the first to attach an important significance to the association. In a communication to the Pathological Society of London in 1887,[1] in which he reported with illuminating details six cases that had come under his care, he maintained that the bond of connexion between the skin disease and the cancer was to be found in the influence of the drug (arsenic) given for the cure of the skin affection. His careful observation and his extensive experience enabled him to detect in these cases a new appearance that was absent in the ordinary phenomena of psoriasis; this was the occurrence of keratoses and warty formations on the palmar surfaces of the hands and feet. "By the prolonged use of arsenic," said he, "the nutrition of the skin may be seriously affected, and, amongst other changes, warty or cornlike indurations may be produced, and if the drug be continued these 'arsenic corns' may assume a tendency to grow downwards and pass into epithelial cancer." He suggested that the effect of the arsenic on the skin was to render it less able to withstand friction and the common kinds of irritation. The striking illustrations which he brought forward in support of his contention excited much interest, and it was not long before more cases were reported from various parts of the world in corroboration. In succeeding years Hutchinson's convictions grew stronger, and he endeavoured, not very convincingly it may be, to attribute many other forms of cancer to the operation of the same agent. Thus, the presence of arsenic in soot explained the occurrence of chimney-sweeps' cancer of the scrotum; the finding of arsenic in beer accounted for the undue prevalence of cancer in brewers and publicans and its frequent incidence in the general population; and even cancer of the tongue might be traceable to the arsenic contained in cured tobacco. He rode the idea with a loose rein. The quest of a single cause of cancer has always led to much speculation, much special pleading, and much disappointment. Certainly arsenic is widely distributed in nature and is present in traces in many of our foodstuffs. Professor Bayet of Brussels is a strong supporter of the "arsenic theory"; he thinks that practically all our industrial cancers are due to the action of the arsenic contained, even in excessively small amounts, in the substances with which the workmen come in contact—soot, tar, pitch, paraffin, and aniline derivatives.[2]

Apart, however, from cases of psoriasis and other skin diseases in which arsenic has been taken in medicinal doses over long periods, there is little clinical evidence in favour of the theory that arsenic can induce cancer. In this country there are only two instances on record which could reasonably be attributed to employment in arsenical works—two workmen who dealt with sheep-dip; miners dealing with ores of high arsenic content show no special liability to cutaneous cancers. The reputed prevalence of lung cancer amongst the Schneeberg miners in Saxony, where the ores contain arsenic, has never been satisfactorily verified. The semi-mythical arsenic eaters of Styria have not been known to furnish any examples. The amount of arsenic in coal tar and paraffin is very small, and there is no evidence that it is the tumour-producing agent in these substances; nor is there any good reason for the belief that arsenic, amongst all the various substances employed in the preparation of dyes, is responsible for the typical bladder cancer of aniline workers.

Nevertheless, a consideration of the reported cases of epithelioma arising in psoriatic patients who have been treated with arsenic must impress one with the possibility that this substance may induce cutaneous cancer. A few years ago Pye-Smith[3] collected most of the reported cases. In all the known instances arsenic, generally in the form of Fowler's solution (containing 1 per cent. As_2O_3), had been taken by the patients for long periods—two to thirty years; in more than half of the cases the epitheliomata were multiple and on different parts of the body; in more than two-thirds the hands or feet were affected, and several were quite young people. Still, the number of cases recorded, some thirty in all, must be very small in comparison with the large number of patients who have taken arsenic medicinally, and certainly no one has yet suggested that the wide use of arsenical preparations in the treatment of syphilis has been productive of cancer. It might be argued that psoriasis is merely one form of reaction to an unknown agent which may otherwise induce epithelioma.

In the hope, therefore, of determining experimentally if arsenic might act as a tumour-producing, or carcinogenic, agent, but realizing that the chances of obtaining a positive demonstration were against us, we fed a series of rats and mice on bread containing arsenic. The bread was soaked in a weak solution of potassium arsenite and then dried, and a ration of dried bread was given to each box of animals, so that each rat would receive approximately the equivalent of 0.075 c.cm. of Fowler's solution, and each mouse 0.05 c.cm. of the same, on each of three days in the week. Even with such small quantities the death rate was unusually high, and the experiments were unsuccessful in the matter of tumour production, although in the rats there was clear evidence that the skin was affected by the elimination of the arsenic. In order to avoid constitutional effects as much as possible, and to give us more latitude in the quantity of arsenic we could use with safety to the animals, we applied the arsenical solution directly to the skin in 100 mice. An area between the shoulders was epilated with sodium sulphide, and a drop of the solution—potassium arsenite in alcohol—was applied by means of a camel-hair brush thrice weekly. The particular site was chosen in order that the mice should not lick off the arsenic, and an alcoholic solution was used so that it might evaporate rapidly without spreading through the adjacent hair. The first applications contained 1.8 per cent. of arsenious oxide, but the quantity was reduced on account of the high death rate to 0.12 per cent. in a fortnight and continued at this strength. Thus for the most part of the time we used a solution of arsenic eight times weaker than Fowler's solution. The exact quantities are of no importance, because the concentration on the skin, owing to evaporation of the solvent, would be relatively high. In three months' time we had lost two-thirds of the mice, but we had succeeded in producing a growing tumour in one of the survivors.

In 86 days a tiny wart appeared on the small area to which the arsenic was applied. In 93 days another small wart arose behind the former, which had now attained the size of a hempseed. The larger wart increased quickly in size, so that in 140 days it was a centimetre in diameter, forming a disc-shaped tumour, freely movable over the deeper structures, raised about 2 mm. above the surrounding skin, and slightly excoriated on the surface, whilst the smaller tumour showed little increase in size. The larger growth increased, becoming more elevated and extending laterally, and definite subcutaneous induration was observed. As there seemed little doubt about the malignancy of the tumour the animal was killed at the end of 5½ months (162 days). The principal tumour, situated on the back of the neck between the shoulders and the ears, measured 2 cm. across by 1.25 cm. from before backwards, and stood well up from the skin level. It was a hemispherical whitish growth, with a reddish, slightly ulcerated dome, hard and white on section, spreading under the adjacent normal skin, and apparently infiltrating the deep muscles (Plate IIIA, Figs. 1 and 2). Close behind it was a simple wart. In the left lung there was a hard white spherical nodule, 2 mm. in diameter, and another nodule half that size in the gastro-hepatic omentum. The cervical and axillary lymphatic glands and portions of liver, spleen, and other organs were taken for examination. Microscopic examination of a section through the large tumour showed it to be a typical squamous-cell carcinoma with cell-nest formation, though not markedly keratinized, spreading underneath the panniculus carnosus for a distance on each side and infiltrating the deeper muscle (Fig. 3). The nodule in the lung was a metastatic deposit repeating the histological features of the parent growth (Fig. 4). The nodule in the omentum was merely a structureless calcified node, and no deposits were found in the lymphatic glands nor in the organs examined.

The experiments are being repeated in order to obtain further examples, but there is little room for doubt, owing to the situation of the tumour on the exact spot where the

arsenic had been applied, the time of its appearance, the fact that another wart appeared also beside it, and the extreme rarity of epithelioma of the skin in mice, that this is an experimentally produced cancer. Rarely induced in man, it may not be more easily induced in mice.

REFERENCES.
[1] Hutchinson: *Trans. Path. Soc. Lond.*, 1888, vol. 39, p. 352. [2] Bayet: *Bull. de l'Acad. Roy. de Méd. de Belgique*, 1919. [3] Pye-Smith, Beattie, and Nutt: *Lancet*, 1913, vol. ii, pp. 210 and 212.

ON THE OCCUPATION CANCER OF THE PARAFFIN AND OIL WORKERS OF THE SCOTTISH SHALE OIL INDUSTRY.

BY

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[*With Special Plate.*]

WHILE the term "paraffin cancer" has become classic, it is not so generally known that the paraffin workers of the Scottish shale oil industry suffer from various well-defined skin lesions, due entirely to their employment, and arising from the handling of and coming into contact with paraffin materials over lengthened periods.

The lesions may be enumerated as follows:

1. Occupation comedones.
2. Folliculitis and perifolliculitis.
3. Pustular dermatitis.
4. Simple erythema.
5. Dermatitis papulare (erythema papulatum).
6. Dermatitis erythematosa.
7. Epithelioma.

The first four of these conditions need not be referred to further, so far as this discussion is concerned, as they play no part in the production of malignant conditions. The other conditions, being of importance in this respect, may be briefly described.

Papular Dermatitis.

This consists of an eruption of small rounded elevations of a reddish colour, varying in size from that of a small peppercorn to that of a small pea. They are solid, superficial, rounded in shape, and contain no fluid. There is as a rule no inflammatory areola around the typical papule; there is neither itching nor irritation; the papules do not tend to coalesce, and as a rule heal spontaneously. They may be present singly or in twos or threes, or in larger numbers until there may be a diffuse eruption of discrete papules. Between 40 and 50 per cent. of the workmen are affected with this type of eruption, and of those affected approximately 50 per cent. show not more than three or four papules, 45 per cent. have a limited extent of eruption confined to a small area, and 5 per cent. have a diffuse eruption. The distribution of the papular eruption is very typical. In the great majority of cases it is confined to forearms, especially over the ulnar aspects, though it is also prevalent over anterior and posterior aspects, around wrists, and on backs of hands. Less frequently a few papules are present on the shoulders, legs, and dorsal aspects of feet. In old-standing cases they are seen over the lower thirds of arms and around elbow-joints. Approximately 75 per cent. of those affected have eruption on hands and arms only, 20 per cent. have both arms and legs affected, and about 5 per cent. have some eruption on the body, as well as on either arms or legs. The earliest appearance of papules after men begin work in paraffin sheds occurs in from ten to twelve days, and they may persist throughout the duration of employment.

Occasionally in old-standing cases the papules assume a warty appearance, due to proliferation of superficial layers of epidermis, forming scaly warts, at first soft, but gradually becoming harder and more indurated, this warty appearance being of a permanent nature. As a general rule this indurated type of papule is first observed on workmen who have been continuously employed in paraffin departments for over eight years or so, and they are present at first singly or in small numbers, and only after fifteen or twenty years of service as paraffin workers are they present in greater numbers, especially over backs of wrists and hands. They may persist in this condition indefinitely.

In the most chronic types of this condition of warty papule there is occasionally a tendency to increase in size, accompanied by the formation of a central necrotic area, which may separate and be followed ultimately by the disappearance of the warty growth, with the formation of a scar. These more chronic types are, as a rule, associated with an old-standing induration of skin. Occasionally a warty papule, instead of disappearing, grows until it assumes the characters of an epitheliomatous growth, with the usual clinical and pathological features of that condition.

Dermatitis Erythematosa.

This is a chronic inflammation of the various layers of the epidermis and cutis vera, followed by induration and, in the most advanced stages, by partial or complete destruction of small areas of the skin in the affected parts. The early appearances are first seen on workmen who have been in contact with paraffin substances for seven or eight years. In the first stages the lesion consists of dull red erythematous patches distributed irregularly over the forearms, giving a mottled or honeycombed appearance. At first the condition is limited to small areas, but, as it becomes more old-standing, involves larger areas, the whole surface of the forearms being frequently affected. This erythematous stage may persist for long periods without further change, or healing may take place, the redness disappearing, being replaced by some induration of the superficial layers of the skin, with a characteristic dry scaliness which is practically permanent. Frequently the erythematous dermatitis progresses so that the deeper layers of the skin are infiltrated and, as the inflammatory process subsides, small patches of atrophied skin, white in colour, appear, or there may be scar formation, according to the depth of the inflammatory changes. There is frequently a tendency to the formation of small, flat, scaly warts, usually oval or circular in shape, which are very typical of old-standing dermatitis due to paraffin. The advanced condition of dermatitis may persist for many years or for a lifetime, with permanent roughness and wartiness of skin and a chronic desquamative process going on.

Chronic dermatitis as described above usually coexists with old standing papular dermatitis, in which the papules are of the indurated type, being hard and scaly. Thus in an advanced stage the forearms show pigmented patches, small white areas of atrophied skin, scars, scaly warts, and indurated papules. The distribution of erythematous dermatitis is confined solely to parts in contact with paraffin substances. The forearms principally are affected, either in parts (especially over ulnar aspects) or generally. In advanced cases the lower thirds or halves of arms are usually also affected. While a considerable proportion of the older workmen show evidence of healed or old-standing dermatitis the condition has become less evident in recent years, and is practically confined to those who have been paraffin workers for years, the recent employees being free from this type of skin lesion.

Epithelioma (Paraffin Workers' Cancer).

Epitheliomata, as seen among the paraffin workers of the Scottish shale oil industry, occur only in those about or over middle life who have been so employed for twenty years or more. They usually arise from warts due to a chronic dermatitis or from indurated papules, and therefore usually coexist with an advanced dermatitis erythematosa in which wartiness is a predominant feature, or with numerous indurated papules of a simple nature. The usual appearance is that of a gradually growing epithelioma in the midst of a chronic indurated dermatitis, with numerous simple warts or indurated warty papules, only one of which has become malignant. I have never seen more than one epithelioma at one time on the same individual, though it is not uncommon for the same workman to have several different growths at various times over a period of years. The warts or papules from which this condition arises have as a rule been present for many years in a benign form, until the epithelial covering begins to proliferate more rapidly, with increasing growth of the primary lesion, until the characters of malignancy develop. These epitheliomata are only met with on those who have been paraffin workers for many years, and, indeed, those which I have seen have occurred after twenty or more years' work among the paraffin materials, the majority being seen after between twenty-five and thirty years of such service. In the early stages of the degeneration the naked-eye appearances vary according to the primary condition, so a short outline of the development from a wart and an indurated papule may conveniently be given.

(*a*) *Arising from Scaly Wart.*—In the benign condition the wart is somewhat oval or circular, about the size of a sixpence. It is covered by small scales, which are readily removable, leaving a somewhat indurated base. The wart does not protrude to any extent above the level of the surrounding epidermis. As the epithelium undergoes proliferation the wart increases in area, and also becomes more raised above the level of the surrounding skin, until it gradually assumes the size of half a crown in area, raised about a quarter of an inch or more above the surface and covered with thick horny scales. On reaching this size there is a tendency for the formation of fissures, or abrasions of the surface, from which a serous fluid exudes, causing crusting of the surface. The crusts are readily removed by any slight injury, but re-form. This appearance persists for some months, the area gradually increasing until the incrustation and warty covering of the growth eventually slough and disappear, leaving a superficial ulcer, from which sero-sanguineous fluid exudes. Subsequent growth of the ulcer in depth and size takes place slowly.

(*b*) *Arising from a Papule.*—An indurated papule has been already described as occurring in old-standing erythematous dermatitis. The papule as a rule persists in this benign form for many years. A central necrotic area may form, accompanied by the gradual growth of the primary lesion. After separation of the slough it may grow until it assumes much larger proportions than formerly, the growth having a central ulcer surrounded by indurated edges. The growth of the ulcer extends peripherally and also in depth, the edges being indurated and undermined until all trace of elevation of tissue above the level of the surrounding skin disappears, so that a large open ulcer is formed, with a base of red, angry-looking granulation tissue, bleeding profusely on the slightest touch. When the growth is situated on the scrotum there is, as a rule, in the ulcerative stages, an overgrowth of epithelial tissue forming large masses, protruding above the surrounding surface, giving the appearance of a cauliflower excrescence, and, being very vascular, they bleed profusely. Ultimately the lymphatic glands are involved in this excrescence, so that in the latest stages the whole inguinal region is invaded by a large ulcerating cauliflower-like mass. The malignancy for a long time is not great, as the lymphatic glands do not become involved till a late stage, but this varies according to the situation, the glands being involved earlier when the lesion is situated on the scrotum than when the site is on the arm or forearm. I have seen occasionally quite advanced tumours and ulcers removed without recurrence, though sometimes amputation of a limb has been necessary, the after-results being satisfactory. In cases terminating fatally death is as a rule due to extensive ulceration with exhaustion, rather than to metastases. I have known very extensive ulceration of the scrotum and inguinal glands, ending in death, unaccompanied by any gross secondary lesion as far as clinical investigation or symptoms indicated. The most common site is on the back of the hand or on the lower third of the forearm, but it is also common on the scrotum, especially among oil workers and labourers, a fact which will be considered later. Epitheliomata have been seen on the face, and at the outer and inner angles of the eyelids, in which latter case the features of a rodent ulcer may be assumed.

Epitheliomata also occur among retortmen, oil workers, stillmen, and labourers, these being a large group of workmen, approximately five thousand in number, quite distinct from the group of paraffin workers. These men do not come into such intimate contact with paraffin substances in the course of their work and accordingly do not suffer from any of the papular or inflammatory lesions which occur among the paraffin workers. On these workmen they do not arise from pre-existing warts or papules, but generally begin as a reddish pea-shaped nodule, in which the typical "cell nests" are present practically from the onset; or they may occur at the site of a simple papilloma or small cyst or mole—simple conditions found frequently on the scrotum under ordinary conditions apart from any occupation cause—but in the great majority of cases the growth is a primary lesion. There is epithelial proliferation, accompanied later by the degenerative changes associated with an epitheliomatous growth. The epitheliomata which occur in oil workers and labourers, as distinguished from paraffin workers, without any primary condition of dermatitis, are as a rule found among those men—such as retortmen, labourers, stillmen, oil workers, etc.—who come into contact with ash, coke, or other gritty material. The scrotum is most frequently the site of such lesions, this being due to the difficulty of ensuring cleanliness of this region.

I have made a list of all cases of paraffin epithelioma which have occurred during the twenty-two years from January 1st, 1900, to December 31st, 1921. In all 65 cases have occurred, of which 19 have been on paraffin workers proper, most of which cases have been seen by me, and 46 among the other grades of labour employed, such as retortmen, stillmen, etc., many of these cases having come under my observation. Since 1918 I have periodically inspected the paraffin workers proper and so have been able to observe the gradual development of malignant features from simple primary lesions, and to have growths removed at an earlier stage than formerly.

In the oil works comprised under Scottish Oils, Ltd., there have been employed approximately five thousand workmen annually for many years, which number includes all forms of labour necessary in the distillation of oil shale and the refining of its products. It will be thus seen that the cancer incidence is approximately 1½ per cent. in twenty-two years, or under 0.1 per cent. per annum. Nineteen of these cases have occurred among those definitely known to have been employed in green sheds (paraffin sheds or crude paraffin departments), there being approximately two hundred men thus employed annually by Scottish Oils, Ltd., during those years. The incidence of this condition among these workers is thus 0.5 per cent. per annum approximately. The ages of the cases recorded vary from 37 to 79 years.

Three were under 40 years of age.
Thirteen were between 41 and 50 years.
Twenty-three were between 51 and 60 years.
Sixteen were between 61 and 70 years.
Ten were between 71 and 79 years.

Of the 19 cases among paraffin shed men the lesions were most prevalent on the arms, forearms, and hands, thus:

Hands, forearms, and arms	12 = 63	per cent.
Face, neck, and ear	3 = 16	,,
Scrotum	3 = 16	,,
Groin	1 = 5	,,

Of the 46 cases occurring among oil workers and labourers the sites were:

Scrotum	28 = 61	per cent.
Arms, forearms, and hands	9 = 20	,,
Face, neck, and ear	7 = 15	,,
Leg	1 = 2	,,
Anus	1 = 2	,,

These figures are in accordance with the facts stated that among oil workers, retortmen, and labourers the tendency is for the primary lesion to occur on the scrotum, being malignant practically from its early stages; while among paraffin shed workmen, as a general rule, the lesion occurs as a degenerative stage of warts or papules, which are most commonly situated on the forearms.

The chief etiological factors predisposing to the formation of paraffin workers' cancer are age, length of service in paraffin department, and idiosyncrasy.

Age.—Age has an important influence on the occurrence of epitheliomata, these being practically never seen under 40 years of age, and as a rule appear at more advanced ages than this. This will be seen from the age incidence already given.

Length of Service.—The importance of a long period of service in paraffin departments as a predisposing cause of chronic indurated dermatitis and epitheliomata is apparent from the following figures. Of twelve paraffin workers who had extensive indurated dermatitis (dermatitis erythematosa) at one examination, the individual lengths of service were 39, 38, 36, 34, 33, 29, 28, 27, 22, 21, 18, 18 years respectively. As epitheliomata of paraffin workers are associated with this indurated dermatitis, the importance of long service is apparent.

Idiosyncrasy.—This plays an important part as a predisposing cause of paraffin epitheliomata. Many workmen have indurated papules and warts due to occupation, from which epitheliomata may develop, but only a small percentage of these undergo malignant degeneration, and, on the other hand, several workmen have had primary growths at different sites on different occasions showing a tendency towards this condition. I have frequently had under observation large warty growths, with a central necrotic area, suggestive of the stage immediately preceding malignancy, which instead of degenerating have healed after separation of the central necrotic area. Cases such as these may be considered as only lacking in the "personal factor."

EPITHELIOMATOUS ULCERATION IN INDUSTRY.

BY

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EPITHELIOMATOUS ulceration in industry was brought prominently to the notice of the Committee on Compensation for Industrial Diseases in 1907, by Mr. J. Wignall (then organizing secretary of the Dockers' Union, and now M.P. for the Forest of Dean), who cited 38 cases as within his knowledge at that time among the patent-fuel workers in South Wales. The Committee visited Swansea, and in their report said: "We have no doubt that the lesions are specific to the trades mentioned, and that they should be made the subject of compensation." The disease was scheduled under the Workmen's Compensation Act, 1906, as "Epitheliomatous cancer or ulceration of the skin . . . due to pitch, tar, or tarry compounds"; but owing to failure of a workman in one of the shale oil works in Scotland to recover compensation when suffering from this condition, the description was widened to read as it now stands: "Epitheliomatous cancer or ulceration of the skin . . . due to tar, pitch, bitumen, mineral oil, or paraffin, or any compound, product, or residue of any of these substances."

Fuller information of the effects of pitch was obtained at a public inquiry made by Mr. A. H. Lush in 1911 into certain proposed regulations of the Home Office requiring, among other things, washing and bathing facilities in factories or workshops for the manufacture of patent fuel (briquettes) with the addition of pitch, other than blast-furnace pitch. On the strength of the evidence given by the workmen as to the increased pain caused by exposure to sun and wind immediately after washing, these requirements of the regulations could not be made obligatory. The evidence was convincing that no class of worker suffers so much discomfort from his employment as does the patent-fuel worker.

When regulations are proposed under the Factory Act they must first be issued in draft, so affording an opportunity to employers and employed to object. The exclusion of blast-furnace pitch was made as the result of such objection by the occupiers of two factories in Scotland manufacturing blast-furnace pitch. They alleged that blast-furnace tar was free from anthracene and naphthalene, and of entirely different composition from that of gasworks tar. In twenty-three years during which they had been distilling blast-furnace tar in the making of briquettes they had not been aware of a single case of disease from handling pitch.

As every piece of evidence on this point is now desired, I think it right to publish the slender evidence (extracted from my report) on which exemption from the proposed regulations was granted.

"At the two works about 32 men altogether are employed in the manufacture and 6 are engaged solely in the digging of pitch. Of these 38 I examined 20 and satisfied myself that the objections had substance. No history of any case of epitheliomatous cancer or of any wart requiring surgical treatment could be obtained. The men had not the same degree of swarthiness of skin noted in the Swansea workers, nor did they complain to the same extent of the sun's rays in causing smarting of the face. Apart from a certain darkening of the skin, all that I could find pointing to effect of the pitch was in one man, aged 60, employed in the pitch bin fifteen years, marked freckling, dryness of the hands, and a wart (not characteristic) on a finger: in a second (a pitch digger) slight thickening of the backs of the hands with hyperaemic patches: and in a third a few acne spots at the angle of the jaw. While no doubt bathing and washing is desirable for these workers, the evidence as to injury to health is not strong enough for regulations."

This point was followed up in an interesting way by H. C. Ross and J. W. Cropper, who showed, on the assumption that a substance is mischievous or otherwise according as experiments did or did not indicate the presence of auxetics and kinetics, that—

(1) Pitch obtained from gasworks tar is mischievous, but not that from tar of blast furnaces.

(2) If the distillation of gasworks tar is carried to a temperature of 360° C. the resulting pitch is no longer mischievous.

(3) Pure anthracene oil is not mischievous, but the commercial rough anthracene cake is so.

(4) The bituminous coal from which gasworks pitch is obtained contains agents of the same mischievous character as those of the pitch, but these are rarely found in the Scottish splint coal, which is the main source of supply for blast-furnace pitch.

From later experiments Ross concluded that the dangerous principles were not anthracene or anthracene oil, but probably some substance intimately mixed with them which distilled over at the same temperatures.

Between 1911 and 1918 the Factory Department was kept informed voluntarily by the principal occupiers of patent-fuel works of the men requiring medical treatment for pitch warts or epitheliomatous ulceration. Reports on these cases were obtained from the certifying factory surgeons. In this way, between the years 1911 and 1919 inclusive, information was received of 158 attacks with three deaths among pitch workers, 12 with two deaths among tar workers, and 12 among the paraffin refinery workers in the shale oil factories in Scotland, making altogether 182 attacks with five deaths. I say "attacks" advisedly, because during the years in question 2 men were included for recurrences five times each, 3 four times each, 10 three times each, and 15 twice each. The number of men affected, therefore, was 130.

In January, 1920, the Secretary of State added epitheliomatous ulceration and chrome ulceration, contracted in a factory or workshop, to the diseases enumerated in Section 73 of the Factory and Workshop Act, 1901 (lead, phosphorus, arsenical, or mercurial poisoning, toxic jaundice, and anthrax), notification of which is obligatory on medical practitioners. The following table shows the number of attacks so reported:

	1920.	1921.	1922, Jan.-June.	Total.
Pitch	32	24^2	10	66^2
Tar	10^1	8	3^1	21^2
Paraffin	3	—	5^1	8^1
Total	45^1	32^2	18^2	95^5

The number of persons affected is 89,* as one man had three and four men two recurrences.

The distribution according to age of the men affected is as follows:

	Pitch.	Tar.	Paraffin.	Total.
Under 20 years ...	—	—	—	—
20 to 30 ,, ...	3	—	—	3
30 to 40 ,, ...	8	—	1	9
40 to 50 ,, ...	20	4	1	25
50 to 60 ,, ...	23	7	3	33
Over 60 ,, ...	5	9	3	17
Not stated	1	1	—	2
Total	60	21	8	89

The duration of employment of these men at the time of notification is shown in the following table:

	Pitch.	Tar.	Paraffin.	Total.
1 to 5 years ...	6	—	—	6
5 to 10 ,, ...	9	1	—	10
10 to 15 ,, ...	8	2	—	10
15 to 20 ,, ...	5	—	1	6
20 to 30 ,, ...	18	6	3	27
30 to 40 ,, ...	10	5	2	17
Over 40 ,, ...	—	2	—	2
Not stated	4	5	2	11
Total	60	21	8	89

* Twenty-one of the 89 were men of whom we had already knowledge as suffering from epitheliomatous ulceration prior to January 1st, 1920.

The situation of the lesion may be stated thus:

	Pitch.	Tar.	Paraffin.	Total.
Scrotum	19	8	2	29
Eyelid	9	2	1	12
Cheek	7	1	—	8
Forearm	—	4	4	8
Lip	7	—	—	7
Hand	3	2	—	5
Neck	3	1	—	4
Wrist	1	2	—	3
Ear	2	—	—	2
Chin	2	—	—	2
Head; forehead; nose; penis; scrotum and nose; scrotum and neck; scrotum and face; scrotum and arms; scrotum and eyelid; scrotum, chin, and leg; lip, face, and hands; arm, leg, and cheek (1 case each)	10	1	1	12
Not stated	3	—	—	3
Total	66	21	8	95

The following table gives the occupation of the men affected and the number employed in 1920, so far as this can be given:

Precise Occupation.	No. Employed in 1920.	No. of Attacks, Jan., 1920, to June, 1922.	No. of Men Affected.
1. *Patent-Fuel Industry.*			
Coal tippers, trimmers, binmen, millmen, pugmen, pressmen, factory labourers	810	24	19
Trolleymen, yardmen, slingers, cranemen	420	6	6
Shippers, pilers, etc.	720	19	18
Fitters, enginemen, firemen, etc. ...	550	6	6
Total	2,500	55*	49
2. *Tar.*			
Gas stokers and labourers	Not available	10	10
Tar distillers	,,	4	4
Anthracene purification	,,	2	2
Other (repairing barges, boats, creosoting, net fixing, etc.)	,,	5	5
Total	—	21	21
3. *Paraffin.*			
Paraffin refinery	200	6	6
Retortmen	Not available	2	2
Total	—	8	8

* The remaining eleven attacks due to pitch were contracted by men handling pitch in other industries than patent-fuel works—for example, gasworks.

The total number engaged in the patent-fuel industry was therefore 2,500. This number includes several who run little risk. Roughly, those included under the first heading work inside sheds and are exposed to pitch dust; under the second in the open air; under the third inside ships stowing briquettes, and exposed to much dust; and under the fourth in the factory premises with occasional exposure to dust. The number exposed to constant risk from tar cannot be given. My impression is that the figure must be a higher one than that for patent fuel, but that as the industry is widely distributed over the country the requirement to notify is not yet sufficiently known. The number employed in the paraffin refineries of the shale oil works is 200. Throughout the period 1920 to 1922 it should be remembered there has been much broken time, several of the works having been at a standstill for months together.

In 1919 the trade unions in South Wales asked for voluntary medical examination to prevent pitch warts becoming inoperable. This was arranged for those over the age of 30, with a duration of employment of over ten years—about 20 per cent. of the total number employed. Owing to the very slow onset of the disease, and trade depression, men have been slow to avail themselves of the opportunity. It is, however, open now to any workman to consult Dr. Scholberg, the pathologist of the Royal Infirmary, Cardiff, and Dr. Sladden, in a similar position at Swansea. Dr. Scholberg thus describes, from his examination in 1920 of 213 men, the two clinical varieties of pitch warts:

"(*a*) The pendulous papilloma, having a slender pedicle, which varies in length from about one-tenth to a quarter of an inch. Such warts may be present for a considerable length of time and give rise to no trouble so far as my observation goes. They are often situated on the upper eyelids and give rise to inconvenience. These for the most part get rubbed off.

"(*b*) The flattened papilloma, but slightly raised from the surface of the skin, having a broad base and a smooth top. They may occur singly or in groups. They will often be seen on the back of the neck or along the sterno-mastoids. The men are often not aware of their presence, owing to their small size, which is as a rule about that of the head of a small pin. This is the type of wart which may increase rapidly in size, and which on cauterization will recur and if left unexcised become epitheliomatous. However, speaking generally, as far as I have observed the percentage of warts that become large and require treatment is relatively small."

No case of aniline tumours of the bladder has been reported. Since January 1st, 1920, notification has been received of 175 cases of chrome ulceration, 93 in the manufacture of bichromates, 69 in dyeing, and 7 in chrome tanning. It is clear from the reports that cases of chrome ulceration from the use of the salts in dyeing take much longer to develop and are much more chronic than those in the manufacture. In none of the cases has there been any suggestion of epithelioma.

X-RAY CANCER.

BY

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X-RAY dermatitis and *x*-ray cancer are well-recognized occupational diseases to which radiographers and the manufacturers of *x*-ray tubes are peculiarly liable. It would appear that as early as 1896 Marcuse[1] described a case of dermatitis and drew attention to the dangers attending the use of *x* rays. However, not very much attention seems to have been attached to this warning, and *x*-ray experiments and investigations continued to be prosecuted during the next few years with great energy and enthusiasm and little or no protection. But in 1903 Sick reported the startling fact that one of the already numerous cases of *x*-ray dermatitis had developed a malignant growth on the affected part. This dramatic complication emphasized the dangers of the work and resulted in great development in the methods of protection. But it was too late to help those already affected with dermatitis, for the damage was done, and during the next few years cases of *x*-ray cancer occurred with a frequency which was a matter of grave concern to those who were exposed to this special risk.

In 1909 for my Hunterian lecture on *x*-ray cancer[2] I found it possible to collect the records of eleven English and nine American cases, and at that date four American and one English case had already terminated fatally, the English case having died as early as 1904. Since 1909 there have been at least three further deaths in this country, making four altogether. Two of them were medical men, one an *x*-ray tube manufacturer, and the other an *x*-ray assistant. It is sincerely to be hoped that we have now reached the end of the fatalities and that *x*-ray cancer will soon be an unknown disease.

I have not had the opportunity to investigate the present position of affairs in other countries, but it would appear that in England only two new cases of *x*-ray cancer have occurred since I investigated the subject in 1909, although of course many of the sufferers—in fact, nearly all of them—have had to submit to the amputation of additional fingers as further growths have shown themselves. I think the smallness of the number of additional cases is probably to be explained by the fact that practically every one of the early cases of severe dermatitis has now developed cancer, and that the

methods of protection in use during the last twelve or fifteen years have prevented the occurrence of new cases of dermatitis of a severity likely to develop into cancer.

There is no need to describe the clinical appearances of *x*-ray dermatitis, but it may be of interest to emphasize some peculiarities of its distribution. In the first place, it is practically confined to the backs of the hands and fingers, particularly the latter. The dermatitis stops abruptly at the wrist at the level of the coat sleeve, showing how slight a measure of protection is necessary and affording proof of the fact that it is the soft non-penetrating rays that do the damage. As might be expected, in those who wore a ring the narrow zone of skin so protected remained absolutely unaffected.

In two instances the dermatitis was not confined to the hands. One of these patients developed changes over an area of the chest corresponding to the V-shaped opening of the waistcoat and also a malignant growth on the chin. The second patient developed one growth on the eyelid and another on the toe.

The clinical history of all the cases is very similar. In nearly every instance there is a definite history of a severe burn, usually as the result of prolonged manipulation of a fluorescent screen. Healing of the burn was followed by the development of *x*-ray warts, and in the course of time one of these warts came to be differentiated from its fellows by growing larger and increasingly painful. Sooner or later the wart came away, leaving a superficial ulcer, which, when removed, generally proved to be an early carcinoma.

In many of the cases the ulcerated areas were so superficial and so harmless-looking that a good deal of doubt was at one time expressed as to the exact nature of the lesions. But examination of the microscopic slides leaves no possible question that we are dealing with a typical squamous-cell carcinoma. I may say, however, that even in the light of earlier experience it was sometimes impossible to form any opinion as to the malignancy or otherwise of a lesion without the aid of the microscope. Several quite innocent-looking warts proved to have epitheliomatous bases, and I suspect that microscopic evidence of malignancy frequently precedes any of the accepted clinical signs by a considerable period of time, just as we see in the tongue and elsewhere.

In neglected cases the growth assumes the usual infiltrating and fungating character seen in other forms of epithelioma. In the most striking case of the kind that I have seen the finger became converted into a huge lobulated mass of growth which infiltrated and destroyed the underlying bone. This patient lost several fingers and then the arm, which is preserved in the museum of the Royal College of Surgeons. When death took place there was also an extensive growth involving the chin and lower lip.

Infection of the lymphatic glands would seem to be uncommon, for although all the four fatal cases had their axillary glands involved, yet the remaining nine cases have had no glandular infection, and in seven of them a period of at least fourteen years has elapsed since the removal of the first growth. And as it must be remembered that nearly all these patients have had multiple tumours and therefore multiple opportunities of developing metastases, it is, I think, fair to assume that *x*-ray cancer may be classed as of relatively low malignancy. Moreover, local recurrence has not been met with even after the very limited excisions that have been sometimes practised. Any further development has been on another finger, or at any rate on a part sufficiently remote from the original growth to establish its independence. There is no such immunity in other forms of cancer, and I have often wondered whether the general changes in the connective tissues, and presumably in the lymphatic vessels, which are characteristic of *x*-ray dermatitis, can have any influence in staying lymphatic permeation.

It is very interesting to speculate as to the amount of irradiation necessary for the production of *x*-ray cancer, and another point of great interest is the intensity of dosage required. Can cancer follow one large dose or a short series of such doses? I believe not, for in spite of the very large number of patients who have been burned in the course of screening or of treatment I have not been able to find a single case of epithelioma arising as the result of such a burn. Of course in *x*-ray workers the conditions of exposure are impossible to analyse, but I believe I am right in stating that those of the earlier workers who have escaped serious trouble were never burnt, while those who have developed cancer have all had either a burn or at least a severe erythema in addition to their small daily exposures.

There are in London now two men who in the early days were constantly exposed for a year or two and were badly burnt in consequence. They gave up *x*-ray work absolutely nearly twenty years ago and have remained entirely free from cancer. The complete immunity of these two men and of the numerous burnt patients proves, I think, that one burn alone is not sufficient to cause cancer; while the immunity of the few *x*-ray workers who have escaped burns but who must for years have been exposed to small daily doses suggests that it is to a combination of one or more burns *plus* a long succession of quite small exposures that *x*-ray cancer must be attributed. For how long these small doses must go on it is impossible to say, but I think it certain that very numerous exposures spread over a considerable period of time must be required. In none of the cases of *x*-ray cancer I investigated was there a shorter period than four or five years between the first exposure and the first epithelioma. In most of them the interval was much longer—in fact, in two cases it was no less than seventeen years. But it is not suggested that continuance of exposure during these long periods is essential, for it appears to be a fact that the changes of *x*-ray dermatitis, when once they are well established, are of a progressive character, and that cancer may develop long after any exposure to *x* rays has occurred.

This long latent period is of great importance from the clinical point of view, for it shows us that no case of *x*-ray dermatitis can be considered safe—at any rate for many years after the last exposure. It is also of interest from the pathological point of view, having regard to Leitch's observations on the progressive nature of the skin changes resulting from the action of other specific irritants.[3] This raises the question as to how far *x*-ray cancer can be regarded as of specific character. Let me recapitulate its clinical features. It is a cancer occurring in young men, some of them only 30 years of age, far below the average age for other skin cancers. Practically every patient has his original growth upon the dorsal surface of the finger, a site where other forms of cancer are so rare that I have been unable to discover an example. There is none even at the College of Surgeons' Museum. In most of the cases the growths were multiple. Porter[4] records one case where ten separate epitheliomas were removed during five years. In every case the growths arose in areas the seat of *x*-ray dermatitis, and finally nearly every case of *x*-ray dermatitis arising in the years 1899–1906 has developed cancer.

I think it is fair to conclude that *x*-ray cancer is caused by the application of a specific irritant, and that in view of its high incidence and special character it may be regarded as the most specific of all human cancers. In fact we might go farther and claim that in *x*-ray cancer we possess the only clear-cut and well-defined example of the experimental production of cancer in man.

Consideration of human *x*-ray cancer naturally invited an attempt at its production in animals, and numerous experiments on rats and rabbits were the result. Varying degrees of dermatitis were readily obtained, but nothing further eventuated, and my experiments were abandoned. I think we were too impatient and had not sufficiently realized the importance of the latent period factor now proved to be so important in the other experimental cancers. A further series of experiments now in progress may perhaps be followed by more success.

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[1] Marcuse: *Deut. med. Woch.*, 1896, No. 30. [2] Rowntree: *Lancet*, March 20th, 1909. [3] Leitch: See papers in this issue. [4] Porter: *Annals of Surgery*, vol. 46, p. 649.

EXPERIMENTAL SOOT CANCER.

BY

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EARLY in 1920, with a view to the finding of some means of producing carcinoma in animals, both quickly and in a reasonably high percentage of cases, an attempt was made to select an active fraction out of soot. Ordinary household chimney soot was chosen for the purpose, its source being that coal known in the trade as "best house." The soot used was from the same source throughout the experiments. Three fractions were selected, and were labelled I, II, and III.

Fraction I.—This was merely an ether extract of the soot. The soot was stirred into ether and filtered through ordinary filter paper, fresh ether being added till the washings came away the colour of a light sherry. The filtrate was distilled and the ether evaporated off until a residue, of the consistency of a thin syrup and still smelling strongly of ether, was left. This was then stored in glass-stoppered bottles till required.

Fraction II.—Three parts of soot and one part of quicklime were intimately mixed with distilled water into a fairly thick paste and spread in thin layers on large glass plates to dry. Lime was selected as the base solely because it gave a mixture which dried readily and did not cake too hard. This mixture produced an abundance of free ammonia. When dry and free from a smell of ammonia the caked mixture was broken up finely and extracted with ether until the final washings were of the same colour as the final washings of Fraction I. This extract was filtered and the ether distilled off and stored as in the case of I.

Fraction III.—One part of Fraction II was added to ten parts of a weak acid (N/10 HCl was used) and shaken thoroughly in a large glass separating funnel. The watery solution was run off and filtered, and fresh weak acid added, the process being repeated until the watery solution came off nearly colourless. This bulky watery solution, which was strongly acid, was filtered and then rendered slightly alkaline with normal caustic soda solution. This produced a precipitate of a yellowish colour which microscopically was seen to consist of oily droplets. The whole neutralized filtrate was then extracted with ether repeatedly till the ether came away nearly colourless. The same procedure was then adopted of distilling off the ether and storing.

Watery extracts of Fractions II and III were faintly alkaline and of Fraction I faintly acid, though neither was appreciably soluble in water. Fractions II and III smelt strongly of the pyridine group, especially III. Fraction I, when freed of ether, was almost black tarry liquid which, when cold, nearly solidified. II was of the consistency of a very thick treacle and very dark, but was browner in colour than I. III was somewhat more fluid, but still very thick, and much lighter in colour than either of the others. Fraction II contained the ether-soluble bases and neutral substances in soot together with colouring matters. III consisted mostly of the ether-soluble bases of the water-soluble salts of Fraction II, also some colouring matter. As previously stated, the pyridines were present in large quantities.

Three groups of young adult white mice were taken, two of twenty in each and one of forty. Care was taken to divide them equally as regards size and colour. One lot of twenty was painted with soot Fraction I, the other with Fraction III. The group of forty were painted with II.

The hair was removed from the back by an epilatory containing barium sulphide. The fractions were applied along the epilated back by means of camel-hair brushes along an area about 2 cm. long by 5 mm. in width. Applications were made two or three times a week. The fractions were usually diluted with a minimum of ether sufficient to render them easy to apply—the ether, of course, evaporated at once on application. The advantages of this were: (1) ease in working; (2) a film was produced on the skin which appeared to stay on the animals longer; and (3) better penetration into the interstices of the skin (and perhaps even into the hair follicles). It was hoped that the lipoid-solvent properties of ether might result in better penetration of the fractions into the cells themselves.

At the outset one can dismiss Fractions I and III. The former produced warts in only three animals by the end of six months, and the latter in only one. Neither had produced definite malignant changes, so at that point they were discarded as not giving the results aimed at. Undoubtedly I was the fraction which produced the most ulceration, whereas III seemed the least destructive. It would be beside the point to discuss whether Fractions I and III would have produced malignancy if application had been continued. Anyway, the method of preparation was too crude to exclude the presence in them of traces of substances (which might indeed be the active ones) present in II.

Applications of Fraction II—the basic ether-soluble fraction—were commenced on December 16th, 1920, and the first wart appeared on February 25th, 1921—in ten weeks and after thirty-one applications. By March 18th, 1921, 16 mice (88 per cent. of the survivors, which numbered 18) had developed warts, and of the survivors at the end of the third month 50 per cent. subsequently developed malignant tumours. The first date malignancy was established microscopically was June 12th, 1921.

In April, 1921, as the second fraction seemed to promise so well, it was decided to see if, perchance, the fat-soluble A vitamin is an additional factor in the production of primary tumours. At this stage a second investigator, Mr. J. L. Woodhouse, joined in the experiment.

Two groups of white mice, fifty in each, were selected, as nearly identical in size and colour as possible. One group was fed on a diet very rich in the fat-soluble factor and the other on one in which that factor was eliminated as completely as possible. It is not claimed to be free of it—it was question of a fat-soluble-rich *versus* a fat-soluble-poor diet.

The vitamin-poor diet consisted of plenty of bread soaked in water, slices of orange once or twice a week, and oats once every ten days or a fortnight. To this diet was added breadcrumbs dipped in olive oil to make the diets comparable as to their fat content. The vitamin-rich diet was the same, except that in place of the olive oil, butter (grass-fed) and cod-liver oil were substituted.

The mice were painted with soot Fraction II as in the first experiment, the conditions being identical in every way throughout the experiment, excepting that of the diet.

Of the survivors at the end of the fifth month of the experiment in the case of the fat-soluble-rich diet, 42.3 per cent. subsequently developed malignancy, and in the case of the fat-soluble-poor diet the corresponding figure was 47.3 per cent. The only noticeable difference in the two groups was that the warts appeared a little earlier in the vitamin-poor diet animals. The tumours were identical in type, and, as far as one could tell, in their rate of growth.

This experiment would suggest that the fat-soluble A vitamin is not a factor in the induction of tumours, as the difference between the two figures is not sufficiently striking, especially as the numbers are not large; furthermore, the death incidence was higher in the vitamin-rich animals, owing to an epidemic in two boxes of this group. But this experiment confirmed the first in showing that this soot fraction is an active one, producing tumours fairly rapidly and giving a high percentage of malignant growths. The malignant tumours were of the same types, mostly keratinizing carcinomata, as are obtained in experimental tar cancers. Forms suggesting sarcomata occurred, but were considered really to be carcinomata.

Malignancy was determined (1) where possible, by autoplasty, as suggested by Dr. Murray; (2) by secondary deposits or recurrence after wide excision; or (3) by deep invasion of muscle where the animal had died before 1 or 2 had time to occur.

It would seem that this is the first time that cancer has been produced experimentally by means of soot, and possibly the lack of success in the past was due to (1) its application in a form which had not much chance of long contact with the tissues and of penetration; (2) an insufficient length of time over which the inoculum was applied; (3) a choice of unsuitable animals; or (4) an unsuitable sample of soot. In connexion with this last, Ross[1] has shown that soot, as pitch, derived from the more bituminous coals is much the most active.

REFERENCE.
[1] *Journal of Cancer Research*, 1918.

THE Dentists Act, 1921, came into force on November 30th, 1922, after which date all practice of dentistry by persons not on the *Dentists Register* is illegal and subject to heavy penalty. The Act was passed as a result of the report of a departmental committee, appointed in 1918, which inquired into the conditions of dental practice prevailing in this country, the competition of unregistered persons practising dentistry in an unrestricted and unprofessional manner having resulted in a serious decrease in the numbers of those willing to obtain a dental diploma or degree. Some 8,000 names of dental practitioners have been added to the *Register* under the new regulations, and no person can now enter the dental profession except by going through the dental curriculum and obtaining a diploma or degree. The only exceptions are in the cases of registered medical practitioners, urgent extractions of a tooth (without an anaesthetic) by a registered pharmacist, and minor dental work in a public service under conditions approved by the Ministry of Health. Persons who passed the examination before July 28th, 1921, but were prevented from registering owing to delay on the part of the licensing body, may be excused the annual fee now payable if immediate application is made to the Registrar.

ADDER BITE.

BY

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PERHAPS it may not be out of place if I draw attention to a subject which is seldom touched upon in medical literature—I refer to the effects of, and the dangers incidental to, adder bite. In June last I saw, on the recommendation of Dr. E. H. Grant Morris of Dalbeattie, a lady living in South Durham, on her way home from Scotland. She had been bitten on the ankle by an adder.

An adder strikes suddenly, and, in the act of striking, the venom is pressed through the hollow fangs into the tissues of the victim. In India snake bite exacts every year a heavy death toll, but we have no exact information of the number of people bitten by adders yearly in Scotland. It may, I think, with safety be said that the number of fatal cases of adder bite is small. While walking over heather-clad moors in Ayrshire it has been my privilege to see adders, also my good fortune never to have been bitten by one. Adders are timid creatures and generally glide rapidly out of sight; they do not bite unless trodden upon or when attacked.

A married woman, aged 54, no children, inclined to stoutness, whose menses ceased at 40, and who occasionally had headache and slight functional cardiac trouble following influenza seven years ago, was in June last, when walking on a moor close to the Solway, bitten by an adder above the left ankle. She saw the reptile escape. On turning down her stocking two small punctures were observed; these were bleeding. She was assisted to a cottage a little distance away; there the wound was not bathed, but the limb was kept elevated. An hour afterwards she was seen by Dr. Morris, by whom the wound was dressed and a stimulant administered. Meanwhile severe vomiting and diarrhoea had developed. A stretcher having been obtained, the patient was carried across the moor half a mile to a point where a motor bus had been brought, and in it she was conveyed to her rooms. These she reached in a condition of collapse. When the limb was again examined it was found to be swollen up to the knee; it was red, but not very tender. She felt, however, extremely ill. The limb was dressed with ichthyol and glycerin. That evening and for the first few nights she slept very well. The vomiting and diarrhoea referred to only lasted a few hours. By degrees she got better, but dependency of the limb caused much pain.

When I saw the patient ten days after the bite she was fairly well generally; her emunctories were acting normally, the pulse was 94, the blood pressure 120 mm. Hg, and the urine was free from albumin. The heart and lungs were normal. The left foot and leg, to within four inches of the knee, were red and considerably swollen; the instep was particularly red and swollen; the calf was oedematous, the veins not enlarged, and the knee-jerks were normal; the two minute punctures of the skin were still visible. A film of blood was sent to Professor Stuart McDonald, who reported the absence of abnormality. The patient, after resting in Newcastle for two days, reached her home all right, but it was nearly three months after the injury before the swelling of the ankle disappeared.

In his letter Dr. Morris reminds me that when he first saw the patient the symptoms were entirely local, but soon afterwards there were the gastro-intestinal troubles I have mentioned, attended by collapse and by an almost imperceptible pulse. The vomiting occurred every ten minutes and the diarrhoea was frequent. Dr. Morris, who has seen other cases of adder bite, considered the symptoms unusually severe. He had not met with diarrhoea in other patients, although in the case of a dog bitten by an adder he had observed vomiting.

Several medical men in the Highlands of Scotland to whom I wrote for facts bearing upon adder bite have replied that they had not seen any cases. Dr. Donald McDougall of Brodick, Arran, gave me details of a lady visitor to Arran whom he had successfully treated for such an injury. The Marquess of Ailsa informs me that, in the case of one of his dogs who was bitten on the pad of one foot by an adder, the limb swelled enormously, and that shortly afterwards the animal appeared to be dead, but that after one of the gamekeepers had slit the wound open with a penknife, squeezed the foot and bathed it with whisky, the beat of the heart and respiration were re-established, and in three days the dog was quite well.

Dr. Lachlan Grant of Ballachulish, to whom I had also written, kindly referred me to ex-Sergeant Morrison of Campbeltown, who is a recognized authority on adders. To Mr. Morrison I am indebted not only for the loan of his typed copy of the pamphlet he intends to publish, but for permission to make use of some of the information it contains.

There are three different species of snakes in Great Britain: the ring snake, the smooth snake, and the adder. The ring snake is olive grey in colour and measures 2 feet or more; the smooth reptile is usually just a little less than 2 feet in length and is reddish-brown; while the adder is about 21 inches in length. The first two types are non-poisonous. The head of the adder is rather flat and tends to broaden towards the neck. The tail differs in the two sexes, that of the male being short and blunt, while the tail of the female is long and pointed. It is owing to the reproductive organs of the male being contained in the tail that the terminal portion of his body is broader than that of the female. Clothed in a coat of mail of scales and plates with a succession of dark inverted V-like markings stretching from head to tail, and with patches of yellow colouring running into the apex of the incomplete triangles, the reptile can be thus recognized and differentiated from the snakes already mentioned. The adder is found widely distributed over the west of Europe—from Spain, through Great Britain, to the north of Europe. It is common in Scotland. The disputational statement of its absence from Ireland, and from some of the western islands of Scotland, such as Iona, does not for the moment concern us. Like the snake tribe generally the adder hibernates in winter. On the approach of winter adders retire into crevices, and therein they remain in a state of torpidity until February or later. Although cold-blooded they are sensitive to cold; they like to bask in the warmth of the sun. Once, at least, during the year they cast their outer covering. The adder produces its young alive. Mating in April, the young are born four and a half months afterwards, towards the end of August or the commencement of September. Little is known of the family life of the adder, for it does not breed in captivity. Morrison on one occasion captured a female adder, took it home, and in about a week afterwards she gave birth to a family of seven, all of whom died within a week afterwards. These animals were 6½ inches long at birth.

Although the phrase "stung by an adder" is frequently used, an adder does not sting, but bites. There is nothing to fear from the forked tongue, which is repeatedly being shot out and retracted again; it is an organ of touch, and is constantly in requisition, since, owing to the fixed orbits of the animal, the range of vision for objects immediately in front of it is extremely limited, especially on the inner half. The fangs of the adder are two slender sharp-pointed teeth on each side of the upper jaw, curving inwards, and barely three-quarters of an inch in length. They are hollow, and lie in a sheath in the palate; in this sheath is also contained a reserve of another pair of fangs ready to be used should the first be destroyed through accident. The poison glands lie behind the eyes; they secrete a clear fluid, like saliva, which is carried by ducts into the fangs. When the animal is about to strike it opens its mouth to nearly an angle of 90 degrees, erects the fangs, darts its tongue out and in with a hissing noise, and then, all at once, the tongue is swiftly withdrawn and the fangs are plunged into the victim. In the act of biting the poison glands are compressed by muscular contraction, and as a consequence two or three drops of venom are driven along the ducts into the fangs, from the tip of which the poison is injected into the wound inflicted, two minute punctures marking the site of the injury. Although the bite of these animals is dangerous, and must never be lightly considered, yet Morrison has frequently removed the fangs from living adders—a dangerous procedure, and an operation never to be undertaken by any person who is not familiar with the handling of snakes, for, if an adder strikes, it does so with unerring certainty.

In confirmation of the severity of symptoms due to adder bite I can hardly do better than refer readers to the story told by Dr. R. S. C. Edleston of Baslow[1] of the sufferings experienced by Dr. H. Peck, Medical Officer of Health for the Chesterfield District of Derbyshire, who was bitten by an adder, first on the right thumb and hand, and immediately afterwards on the left thumb, when near a reservoir, testing water for peaty acids. Seeing a snake on the ground he picked it up and was bitten. He at once sucked the wounds. Shortly afterwards he felt as if his head was bound by a tight girdle; he became faint and vomited; his lips, tongue, and fauces swelled and breathing became difficult. When seen three hours afterwards by Dr. Edleston there was great

[1] BRITISH MEDICAL JOURNAL, September 11th, 1909.

exhaustion, for which stimulants were given, followed by the hypodermic administration of digitalin and strychnine. For several hours the patient was extremely ill. The right arm swelled considerably, and at one time it seemed as if it might become gangrenous. It was three weeks before the swelling of the arm disappeared.

Probably some persons are more susceptible to the influence of adder bite than others, but no one is altogether immune, nor are such animals as the horse, dog, and sheep. Morrison carried out a series of experiments with frogs and toads, and he found that these animals were immune to the bite of an adder which had been five weeks in captivity. The immunity does not appear to be due to the fact that these animals are cold-blooded, for a lizard bitten by the same adder died twelve minutes after being bitten. Morrison, after raising the question as to whether the immunity possessed by frogs and toads may not be due to the presence of an antitoxin in their tissues, states that he has submitted the results of his experiments to the Wellcome Bureau of Scientific Research.

Treatment.

All writers upon the subject are agreed that since symptoms rapidly supervene, and quickly assume an alarming nature, treatment should be prompt; but as the accident occurs usually in out-of-the-way places, and often at considerable distance from a human habitation, help is often not readily obtained. Such constitutional symptoms as difficult breathing, attended by collapse and a small and irregular pulse, call for the immediate use of stimulants, and upon the value of the prompt administration of whisky or brandy there is complete unanimity of opinion. So far as I know, there is no antivenom treatment for adder bite. Since the poison rapidly produces constitutional effects, an attempt should be made to prevent it being absorbed by sucking the wound, if there are no cracks on the lips, by incising the wound and allowing it to bleed rather freely, also by applying an alcoholic lotion or a fairly strong solution of potassium permanganate. In the case of many persons who have been bitten by an adder a ligature has been tightly applied round the limb on the cardiac side of the injury. Dr. McDougall of Brodick successfully treated his case of adder bite by freely incising the bitten part, cauterizing it with pure carbolic acid, and dressing the wound with permanganate solution. In his patient very few constitutional symptoms followed, notwithstanding the swollen state of the foot. In Dr. Morris's patient the constitutional symptoms were already severe before he arrived on the scene, or at any rate shortly afterwards, but, combating the collapse by means of stimulants, subsequently dressing the swollen limb, first with ichthyol and glycerin, followed later by warm lead lotion, and the internal administration of quinine and phosphoric acid, the patient was placed out of immediate danger in the course of a few days.

Natives of East Africa are extremely afraid of snakes. Discussing this subject with Dr. A. R. Cook, the well-known medical missionary of Uganda, he told me that the number of persons bitten by snakes in Uganda is small, also that he had found the application of a ligature on the cardiac side of the wound, incision, and the application of permanganate crystals gave the best results. The various methods of treating snake bites form interesting reading. The old European method of treating snake wounds in India was to incise the wound, pack it with gunpowder, and ignite the powder. In tropical countries the bites used to be treated by the natives by means of a charm—the serpent's stone—which was said to adhere to the wound and later on to fall off.

Incidental to what has just been stated in regard to adder bite, and bearing upon the collateral subject of snake bite, there have recently appeared in the *Times* abstracts of letters relating to the African puff-adder. The writer of one communication states that he himself had been bitten by an African puff-adder and that he knew of four other white men who had been similarly injured, also of nine natives and Indians. He himself suffered agonies until he was relieved half an hour afterwards by a Kaffir witch doctor; with an experience of thirty cases the fatalities, he said, were 80 per cent.

Snake bites are extremely fatal, and frequently with great rapidity. One of my nephews who has recently returned from Burma informs me that when in that country he saw an American oil-well driller who, on dismounting from his horse, inadvertently trod upon a small snake. The reptile struck him upon the inner side of one of his ankles. The accident occurred in the interior of the country. My nephew, who is not a medical man, but who had witnessed the accident, at once applied Condy's fluid to the wound, dressed the limb, and advised the American to go to the nearest hospital three miles away. The patient did not then feel sick, neither was he collapsed, nor did he feel ill. He remounted and galloped off to the hospital, but he had only gone about half a mile when my nephew, who was watching, saw him fall from his horse, and running forward he, on reaching the spot, found that the American was dead. Death occurred in this instance within half an hour after the injury.

In alluding to the African puff-adder mention was made of the rapid cure of snake bite by a native witch doctor. My nephew told me an interesting story which I simply reproduce, in the hope that it may be corroborated or refuted by those concerned, should they perchance ever read this article. One afternoon he went to Pakokku to spend a few hours with the British doctor at the hospital. In the hospital compound at the time were several snake charmers with whom conversation sprang up. Although these charmers can apparently force snakes to do almost anything they wish yet occasionally the men get bitten. At any rate they showed several minute scars on their hands and arms, which might, or might not, have been caused in the manner they stated. On being asked if they had ever been affected by the poison the men replied in the negative, but they would not say why they had not suffered. Ultimately the snake charmers agreed to a suggestion of the doctor that three experiments should be tried: (1) a chicken was to be bitten by a snake and treated by the snake charmers; (2) a chicken was to be similarly bitten and not treated; and (3) a chicken similarly affected was to be treated by the doctor. The results were as follows: the chicken which was not treated died in twenty minutes; that treated by the doctor died in about the same time. Chicken No. 1 was taken by the men to behind some brushwood quite close at hand, but where their movements could not be seen; they returned with the animal after being absent about ten minutes, and on the following day the fowl was quite well and remained thus. Nothing could draw from the natives the method of treatment they had adopted.

A SIMPLE METHOD OF TREATING CLUB-FOOT

(CONGENITAL TALIPES EQUINO-VARUS).*

BY

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THE following is a simple method of treating club-foot that I have employed for the last ten or twelve years.

It is, of course, well known that the apparent correction of the deformity of club-foot does not in itself constitute a cure. It is necessary after the deformity has been corrected to employ some means of keeping the foot continually in the corrected position until growth and adaptation have changed its anatomy and rendered the correction permanent. This end was attained formerly by putting the child into a walking instrument or apparatus designed to keep the foot in the corrected position during the day—a splint being used at night. Such an instrument is expensive in the first instance. It requires constant adjustment in the case of a growing child, frequent repairs to make good breakages and wear and tear, and an amount of intelligence, which is not always forthcoming, on the part of the parents or guardians to see that it is put on properly and is doing its work efficiently. One has seen many relapses and poor results owing to the failure of instruments to act efficiently from one cause or another, and such causes are often beyond the control of the surgeon. But, apart from this, it is a most unfortunate thing to have to put a healthy child into "irons" for some of the best years of its life.

In recent years a good deal has been done to eliminate instruments from the treatment of club-foot. Some surgeons treat these cases in a succession of plaster casts until they judge that the correction is permanent. Others have done simple or elaborate tendon transplantation or other operations. No orthopaedic surgeon nowadays does drastic bone operations on club-feet in children. The method here described appeals to me because it is simple, efficient, and

* Demonstrated before a meeting of the British Orthopaedic Association in London on October 20th, 1922.

it does not interfere with the anatomy of the child's foot. The procedure is as follows:

Correction of the Deformity.

The apparent deformity is first fully corrected in the ordinary way by tenotomy, manipulation, and splinting. I personally always divide the two tibial tendons and frequently some of the ligaments on the inner side of the foot, because I believe that better correction is obtained after tenotomy than without it, and I have never seen any ill effects follow the division of these tendons in club-feet. We prefer gradual correction, by daily manipulation and the use of a splint, to forcible redressment under an anaesthetic, because a much more natural and supple foot is eventually obtained by the gradual method. When the varus part of the deformity has been completely corrected or overcorrected I divide the tendo Achillis and frequently the posterior ligaments of the ankle-joint, and again I have never seen the slightest ill effects from this tenotomy in club-foot cases. The equinus deformity is now completely corrected, and the foot is put on a trough splint with a footpiece at a right angle ("tin shoe"), or it may be put in plaster. It is allowed to remain thus for at least a week or two—sometimes it is convenient to wait some months—before the fixation operation.

Fixation Operation.

The object of this operation is to secure permanent fixation of the foot in a corrected position by means of an artificial ligament attached to the outer border of the foot below and to the outer side of the tibia above.

Pearsall's No. 3 pearl silk is prepared according to Lange's formula.* A suitable length is taken out of the melted paraffin with forceps, and the excess of paraffin is removed with a sterile swab.

An incision a quarter of an inch long is made down to bone on the dorsum of the base of the fifth metatarsal bone. A drill with an eye near the point is passed through the base of the fifth metatarsal and thrust out through the sole of the foot. A guide loop of salmon-gut is threaded into the eye of the drill, and by means of this one end of the silk is pulled into the sole, through the base of the fifth metatarsal, and out through the incision on the dorsum. The drill is again passed into the same incision, but this time round the outer side of the metatarsal, and it is made to emerge through the same puncture in the sole. The eye is again threaded with a loop of salmon gut, and the other end of the silk is pulled through to the dorsum. The two ends are pulled out to an equal distance, so that the middle of the silk surrounds the outer half of the base of the fifth metatarsal.

On pulling the loop tight it will often be found that the skin of the sole is dimpled at the point where the silk was passed through, and we have found that when the dimple is allowed to remain the patient sometimes complains of pain afterwards at this spot. So it is well at this stage to give the middle of the loop a few sawing movements—like using a Gigli's saw—and the dimple will then disappear. This also ensures that the loop lies close to the bone and prevents subsequent slackening. A single hitch is now tied in the middle of the loop of silk.

Next a long special probe with an eye near the tip is thrust into the incision on the dorsum of the foot and is carried deeply in the subcutaneous tissues up the outer side of the leg. The tip should be kept well back, and it is made to project beneath the skin somewhere in the lower third of the leg, just in front of the plane of the fibula. A stab incision is made over the tip, which is then thrust out of the leg. The eye is threaded with a salmon-gut loop, and this is pulled down to, and out of, the incision on the dorsum of the foot. Both ends of the silk are then passed into the loop and pulled up to, and out of, the upper incision.

The last step is to pass both ends of the silk separately through the tibia, and to tie them on the inner side. The bone drill is therefore passed into the upper incision and bored straight through the middle of the shaft of the tibia until its point projects beneath the skin on the inner side of the leg. A curved incision is made down to bone, so as to turn back a small flap over the point of the drill. The drill is then pushed out of the wound and its eye is threaded with a loop of salmon-gut. This loop is pulled through to the outer side of the leg, and one end of the silk is passed into it and pulled through to the inner side. The other end of the silk is passed in exactly the same way, but through a separate drill hole at a slightly higher level.

An assistant now holds the foot firmly in an overcorrected position—that is, abducted and everted. The two ends of the silk are pulled tight, first separately, and then together. Finally, they are tied very tightly in a triple knot on the inner side of the tibia. The little wounds are all closed with fine horsehair stitches.

The foot is now held permanently in the corrected position by a stout ligament attached to bone above and below. It is put on a tin splint for a week or ten days. The stitches are then taken out, and the foot and leg are put in plaster. The plaster is kept on for two months, then it is cut off, and the patient is allowed to walk in ordinary boots or shoes. It should, however, be seen that the boot or shoe is made flat on the inner side.

Instruments.

One or two special instruments will be found useful for this little operation. One is a steel probe for passing the silk up the leg. This has a straight shaft about seven inches long mounted on a handle. The tip is smooth and rounded and slightly turned up (coudé), and there is an eye near the end. The other is a bone drill with a cylindrical shaft. Most of the bone drills on the market have a shaft which expands more or less from the point towards the handle, so that when they have penetrated some distance one is attempting to drive a cone into the hole made by the point. I have therefore had drills made with straight cylindrical shafts, so that they can be passed easily for their whole length. The best form of point is, I think, the miniature gouge, but there should also be a slight groove on the convex side, otherwise the salmon-gut loop is cut as it is pulled back through the bone. These instruments have been made for me by Allen and Hanbury and Krohne and Sesemann.

Remarks.

Failures are nearly always due to faulty technique. Failure to obtain complete correction or overcorrection of the deformity before the fixation operation is the worst mistake. The silk should play no part in the correction; it should merely hold the foot in the corrected position. A certain amount of "give" must be anticipated, and the assistant must hold the foot well everted while the silk is being tied. The amount of correction often looks rather excessive at first.

Failure to keep the silk close to the bone, and to pull it tight enough, is another mistake. If a considerable amount of the soft parts is included in the loop in the sole this will subsequently be absorbed, and the silk will slacken.

The base of the fifth metatarsal is a small thing in a small child, and if the drill strikes it too near its outer side, or if the drill is too large, the thin slip of bone which is caught by the silk may give way. On the other hand, it is not satisfactory to pass the silk round the metatarsal, instead of through it, as I found in some of my earliest cases.

In working through small stab incisions it is impossible to avoid all contact with the skin, as one would like to do in silk operations. So that occasionally there is a mild infection, and a sinus forms, and the silk has to come out. This risk is not great, and I have preferred to take it rather than elaborate the operation.

In passing the probe up the leg the tip should be kept as deeply as possible in the subcutaneous tissues. It should not, however, pass under the annular ligament. The skin is very intolerant of pressure on its deep surface, and if the silk is placed too superficially the skin may slough over it where it crosses the angle between the foot and the leg.

When the silk has been in place for two months or more it will be found that the foot retains its position even though the silk be removed. I have shown by dissection that this is due to the formation of a fibrous cord around the silk, and that this fibrous cord acts in just the same way as the original silk ligament. The silk itself I have found to be absolutely unchanged after nearly two years. For this reason when a sinus forms, either from mild infection or sloughing, the silk should not be removed at once unless the discharge is excessive. When the silk has to be removed one of the cords is cut and the other is forcibly dragged out with Spencer Wells forceps. It nearly always comes out intact, knot and all.

* The silk is first boiled for twenty minutes in 1 in 1,000 mercury perchloride solution. It is then dried aseptically between sterile towels for two days. It is next put into a jar of melted soft paraffin (white vaseline) and cooked in this in a water-bath for two hours. It is kept in the paraffin, which solidifies on cooling, and it is melted down before each operation by standing the jar in an ordinary sterilizer.

In mentioning these causes of failure I may perhaps add that a little practice and familiarity with the operation goes far to eliminate them, and I see far less of them now than formerly. With these few exceptions I have found the operation entirely satisfactory. The children have nice supple active feet, permanently corrected, and they are from the beginning freed from the burden of instruments.

PNEUMOCOCCAL INFLUENZA.

BY

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THE name "influenza" is applied to a variety of ailments. In the recent great pandemic *B. influenzae* was shown to be the infecting organism in a very large number of cases; there may be, however, small local epidemics, influenzal in type, which are caused by other organisms. Clinically the cases have the appearance of influenza, and one might class them, as Sir William Osler suggested, under the head of "influenza nostras."

The series of cases here described occurred among the nursing staff and students of a hospital during the early part of this year. The epidemic began early in January and went on till March, and comprised some forty cases. The pneumococcus was the organism found in overwhelming predominance on examination of throat swabs by direct smear and culture in every case. *M. catarrhalis* and streptococci also occurred, but were in the minority, and *B. influenzae* was not seen. Pneumococci were also the cause of such complications as occurred. Clinically the cases varied from a slight headache, sore throat, and fever to very severe prostration.

In almost every case the first symptoms were referred to the upper air passages. Some complained of having had a cold for a day or two, or a sore throat; in others the onset was more sudden. Then followed headache, which was usually frontal, and attacks of shivering, with pains all over the body, especially in the back and limbs. Such symptoms are similar to those described as the nervous symptoms of influenza. The headache in some instances was intense. Most cases had more or less photophobia, and in some there was considerable conjunctival injection. The tongue was coated with white fur as a rule; in four instances there was vomiting, which persisted for three days in one case. There was no marked diarrhoea or constipation. Fever appeared with the other symptoms. The temperature in some cases reached 104° F.; in others there was only a slight rise. As a rule there was in uncomplicated cases no fever after four or five days.

Sore throat was the most common complaint, and there were patches on the tonsils in most cases; injection was acute in all. The throat and nasopharynx seem to have been the points of attack of the infecting organism. In five cases there appeared on the fauces and soft palate, and on the uvula to a varying degree, a whitish, shining exudate, which had a glazed look; it gradually spread over the surrounding parts, was very thin, almost transparent, and easily detachable. From each of these cases almost pure cultures of pneumococci were obtained. The parts of the throat not covered by the exudate were very injected. The presence or absence of tonsils did not appear to have any influence on the incidence of the infection, but the patients without tonsils got off more lightly. Only three slight cases of adenitis occurred, and the glands at the angle of the jaw were only affected to a small degree in the most severe cases of throat infection. There was not much tendency to downward spread of the infection; bronchitis occurred twice, and there were two cases with pulmonary consolidation; one of the latter ended in widespread bronchopneumonia which proved fatal.

In six of the most severe cases a scarlatiniform erythema appeared early in the illness. It showed itself uniformly on the limbs, trunk, and face at the same time. The extensor surfaces of the limbs tended to be most affected. There was no itching. As the temperature fell the rash faded, leaving the skin rather yellow. There was a very slight powdery desquamation afterwards in two cases. The appearance of the rash was the signal of acute infection, and the patient was soon very ill. The throat was always markedly affected in these cases, and four of them showed the distinctive exudate described above.

Direct spread of the pneumococcus caused such complications as there were. The pus from a double mastoid infection, which set in on the fourth day, gave a pure culture of pneumococci. The same was true of three cases of empyema of the antrum, as also of an acute case of conjunctivitis which began three days after the onset of the original infection.

Clinically these cases exhibited the rather protean symptoms of influenza, although *B. influenzae* was not the cause. The pneumococcus was often present as a secondary infection in cases of true influenza in the recent epidemics, but this outbreak illustrates the observation of Pulfrey[5] that a primary pneumococcal infection may cause an epidemic with all the clinical appearances of true influenza. This has also been noted by Peset,[4] who found the pneumococcus to be the cause in 62 per cent. of cases in an epidemic.

Toxic erythemata are seen in acute infections, generally streptococcal in origin. They may occur in pyaemia[1 3]. Such rashes have been described in cases of influenza by Hainiss[2] and others. Sir W. Osler mentions them as occurring occasionally in pneumonia. No doubt in the outbreak here described they were caused by the absorption of toxins from the throat; it may be noted that they were seen only in the worst cases. The appearance of the throat exudate described above was very striking and distinctive. It would appear to be characteristic of acute pneumococcal infection in the throat.

These few cases serve to show how closely true influenza may be mimicked by an infection due to another organism.

My thanks are due to Dr. Harold Wiltshire for his kindness in allowing me to publish this account.

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A CASE OF BRONCHO-BILIARY FISTULA.

BY

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THE following case is an unusual one, and at the same time of sufficient practical clinical interest to merit its being placed on record.

A labourer, aged 47, went to his doctor in June, 1921, complaining of some loss of weight and of feeling generally weak and ill. A few days later a severe hiccup commenced which lasted for nine days and then ceased abruptly. It was so severe that it deprived him of sleep and seriously interfered with eating, and even with speaking. On its disappearance he complained of nothing beyond general weakness, but three weeks later a cough began with copious expectoration which he described as being "like brown jelly and sometimes streaked with blood." This continued for a month, when the colour of the sputum suddenly changed to yellow. It was now intensely irritating and associated with a violent paroxysmal cough which sometimes led to vomiting.

Such was his condition on admission to hospital on November 5th, 1921. His previous record included scarlet fever at 8, pneumonia at 16, and gonorrhoea at 19. He had never been abroad, and had never had any illness resembling dysentery.

He was found on admission to be coughing up large quantities of clear bright yellow fluid, which consisted almost entirely of bile. It contained a few Gram-positive cocci and one or two cells, but no pus. No traces were found of amoebae or the hooklets of *Taenia echinococcus*. He was emaciated and weighed 7 st. 4½ lb. Before his illness he weighed 9 st. 2 lb. He was not jaundiced.

Examination of the chest revealed a small area of impaired resonance at the base of the right lung over which medium crepitations could be heard. The breath sounds over this area were harsh and vesicular in character; the vocal fremitus and resonance were not altered.

The liver was a little enlarged and just below the right costal margin could be felt somewhat rounded and hard. There were several dilated veins in the abdominal wall, chiefly on the right side both above and below the umbilicus. The spleen was not enlarged, there was no ascites, and examination of the faeces failed to reveal any evidence of amoebae. The Wassermann reaction was negative and radiograms showed nothing abnormal.

It was clear that a communication had in some way been effected between the bile passages and the bronchi, and as the condition was causing acute distress Professor A. M. Connell operated on November 25th. Portions of the eighth and ninth ribs were resected on the right side and the upper surface of the diaphragm explored. Dense adhesions were found between the base of the lung and the upper surface of the diaphragm, but no opening through the diaphragm was seen. The adherent surfaces were

separated as completely as possible and a drainage tube inserted from which for a few days a small amount of bile escaped.

After the operation the coughing of bile ceased completely for five days and then began again. He continued to cough up a considerable quantity for some time, but it steadily diminished and ceased altogether about a month after the operation. He was discharged on January 9th of this year, feeling well, free from cough, and having gained several pounds in weight. The wound was quite healed, the crepitations at the right base had gone, but some dullness remained. The signs in the abdomen were unchanged.

When examined again, six months later, he felt perfectly well and was doing full work. He had regained his former weight, the enlarged veins in the abdominal wall had disappeared, and there were no abnormal signs in the chest with the exception of slight persistent dullness.

It is an uncommon event for bile, at any rate in quantity, to find its way into the thoracic cavity. When an abscess of the liver ruptures it does so most commonly upwards through the diaphragm, either into the pleura or into the lung, and in the latter case large amounts of pus may be evacuated via the bronchi, and sometimes the pus is mixed with bile. In the present case an abscess of the liver appears to have penetrated the diaphragm and discharged itself into the lung, and at the same time to have effected a communication with one of the larger bile passages, with the result that pure bile continued to escape long after all pus had disappeared. This seems altogether more probable than the alternative supposition that the primary focus was an empyema which burrowed through the diaphragm and deeply into the lung.

T. R. Elliott and H. Henry[1] described some cases of internal biliary fistulae—one into the lung and one into the pleura—which resulted from gunshot wounds. They noted particularly with regard to the latter, in which pure bile was aspirated from the pleural cavity, the absence of any evidence of an inflammatory reaction on the part of the pleura. The expectorated bile in the present case was similarly lacking in inflammatory products. There was no pus visible either to the naked eye or microscopically during the whole period of observation, though a few organisms were found in it.

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RESTORATION OF THE ROUND LIGAMENTS.*

BY

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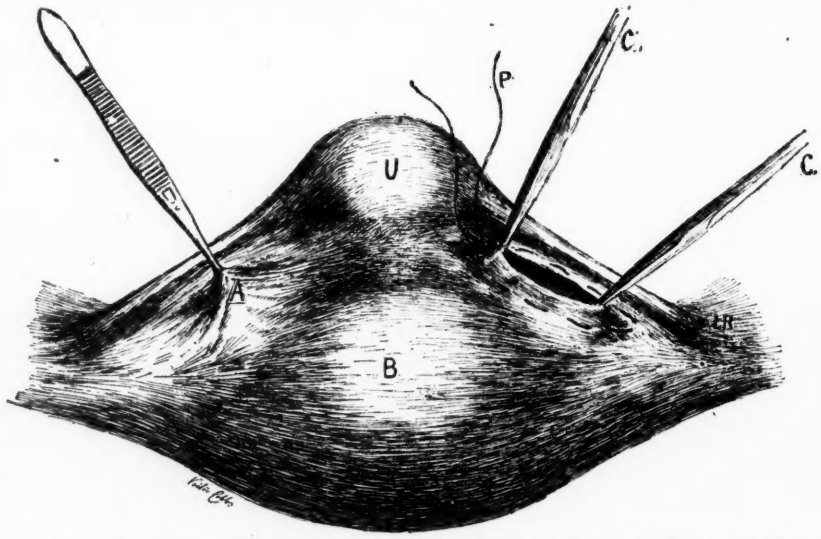
IN one of his many moments of inspiration Lawson Tait fixed the fundus of a retroverted uterus to the anterior abdominal wall by a silk stitch. Out of this inspiration to meet a sudden emergency during a pelvic operation was evolved the independent operation of hysteropexy—an operation which by its very simplicity captured the imagination of gynaecologists and very largely held the field a couple of decades ago in the surgical treatment of retroversion of the uterus. But with the progress of the years evil sequelae were reported, and then came the reaction from the early enthusiasm—a reaction threatening to relegate hysteropexy to the surgical scrap-heap.

Meanwhile the popularity of the Alexander - Adams operation had necessarily waned, in spite of its proven value, and in spite of Goldspohn and Stewart McKay having both shown that during the course of the operation limited access to the pelvic abdomen might be obtained through the same skin incision. It was not, however, until after the year 1900, when the intra-abdominal operation of Gilliam had entered the field, that the prestige of the Alexander-Adams operation was seriously imperilled. But with the advent of the Gilliam operation was ushered in a wave of enthusiasm for the free intra-abdominal method of curtailing the overstretched round ligaments, and to-day the Gilliam procedure or one of its modifications appears to be that most commonly employed in British communities, although it must be admitted that the Baldy-Webster operation has many warm advocates. This latter operation, as with certain others (Mann, Dudley, Murphy) shortens the overstretched round ligaments by eliminating its inner portion, while the Gilliam type and the Alexander-Adams cuts out the outer portion of the ligament.



Restoration of the round ligaments. A., Fold of anterior leaf of broad ligament, between round ligament and bladder; C.C., forceps and cut edges of incision in anterior leaf of broad ligament; P., purse-string; U., uterus; B., bladder; I.R., internal abdominal ring. Drawn from a dissection made in the Perth Hospital, with photographs by Dr. G. W. Barker.

Long simply puckers up ("shirring") as much of the intra abdominal portion of the ligament as may be necessary to produce anteversion of the uterus.

Genesis of the Operation.

With the exception of hysteropexy most of the numerous operations for retroversion are based on the view that the excess in length of the overstretched round ligaments should be eliminated by excision or by looping. This view is obviously opposed to the fundamental surgical principle that the ideal treatment of an acquired abnormality is that which restores it to the normal. The ideal treatment then of an overstretched round ligament would be the restoration of the ligament to its original dimensions. How was this end to be achieved?

It first occurred to me that, in retroversion, hysteropexy (Kelly) might be carried out, and the "false ligament" cut away a year or two later. I had seen cases in which this had been done, and in which the uterus had subsequently maintained its anteversion. In such cases the abdomen had been opened on the second occasion to deal with some fresh condition. To reopen the abdomen, however, solely to cut away the "false ligament" seemed to me, on consideration, unlikely to be practicable, and I abandoned the idea, although the fundamental principle as to the ideal treatment of acquired abnormalities still dominated my outlook.

Meanwhile I had been employing the Montgomery-Gilliam operation, but towards the end of 1913 I began a new procedure, sewing up a loop in the round ligament reached by a short incision parallel to it in the anterior leaf of the broad ligament. One day I noticed that when I had tied a purse-string to close the opening in the broad ligament the uterine anteversion was increased beyond that produced by the loop in the round ligament. In subsequent cases I applied this observation, when necessary, by deliberately extending the incision (and the outer and inner limits of the purse-string). But during this period I made two other observations: (1) that the material of the anterior leaf of the broad ligament generally appeared to be stronger than simple peritoneum; and (2) that in many cases of retroversion this leaf of the broad

* Read before the West Australian Branch of the British Medical Association on September 20th, 1922.

ligament was unduly lax. Whether this laxity was cause or effect I was unable to decide. It seemed plausible that it might represent a result of frequent overdistension of the bladder; but, on the other hand, it might represent an effect of long retroversion of the uterus, the primary fault being softening of the round ligaments from congestion extending from the uterus. However, whether the laxity was cause or effect, it appeared reasonable to think that by removing it and placing the uterus in anteversion the overstretched round ligaments would be given physiological rest and thus put in the best position for restoration to the normal.

By this time (about June, 1914) the meaning and force of my observations had become fairly well crystallized. I was satisfied that the material of the anterior leaf of the broad ligament was elastic and strong enough to hold the uterus anteverted, without direct interference with the round ligaments, and, furthermore, that by adequate extension of the incision (and purse-string) in the broad ligament the undue laxity of the anterior leaf of the broad ligament must be reduced.

The Operation.

The way was now clear to put these views to the test of practice, and on July 9th, 1914, I deliberately carried out the operation of restoration of the round ligaments in a case of retroversion in the Perth Hospital. This operation consists in splitting the anterior leaf of the broad ligament parallel to the round ligament, between the round ligament and the bladder, undermining the opening, and closing it by a purse-string, the outer limit of the purse-string being in the vicinity of the internal abdominal ring and the inner limit being towards the uterine cornu. The immediate effect is to bring the uterus into anteversion, and to demonstrate the round ligaments contracted down to their normal length—an interesting physiological experiment performed directly under the eye. Furthermore, the undue laxity of the anterior leaf of the broad ligament is seen to be reduced.

Results.

I have carried out the operation of restoration of the round ligaments in over two hundred cases, many of them subsequently going through pregnancy and parturition, so that I am in a position to speak with some little authority as to the value of the operation. In one case the operation was performed in about the sixth week of gestation, and there was no subsequent trouble, parturition being quite normal and the uterus remaining anteverted. In another case, recently reopened for some fresh morbid condition a few years after the operation, there was no obvious evidence of the primary operation, the uterus being in anteversion and having its normal motility, although there had been an intervening parturition. On the other hand, in another recent case, in which the Montgomery-Gilliam operation had been carried out some years earlier, hysterectomy proved exceptionally trying on account of the anatomical disorder in the pelvis caused by the first operation.

Standard of Efficiency.

The conditions to be fulfilled by an ideal operation for retroversion of the uterus may be stated as follows: (1) It will conform with the principles of rational surgery in that it restores the abnormalities to the normal; (2) it will permit of adequate access to the pelvic abdomen; (3) it will leave no condition which may prove a source of future disability or danger; (4) it will stand the strain of pregnancy and parturition; and (5) it will not complicate future operations on the pelvic abdomen.

I know of no operation which appears to fulfil these conditions so completely as restoration of the round ligaments. This restores the round ligaments to their original condition as nearly as is ever likely to be possible, while at the same time it reduces undue laxity of the anterior leaf of the broad ligaments. It practically restores the abnormal to the normal without introducing any factor that might prove a source of trouble either of itself or in case the abdomen should need to be reopened in the future. In none of the cases subsequently coming under my notice have pregnancy and parturition been attended with difficulty from the operation or with recurrence of the retroversion.

Operative Technique.

A good light and the Trendelenburg position are almost essential. The suprapubic abdominal incision may be the ordinary vertical or the transverse. Retraction of the wound edges should be adequate to expose the round ligament in its whole length in the abdomen. For the incision in the anterior leaf of the broad ligament a fold is raised between the round ligament and the bladder, snipped into, and the opening freely undermined, and extended outwards and inwards. The commencement (outer limit) of the purse-string suture (silk or Pagenstecher) is made near, and a little on the pelvic side of, the internal abdominal ring. The suture terminates just beyond the inner end of the incision. If the free ends of the purse-string are now caught together and pulled on, the tissue in which the thread is placed will be drawn somewhat inwards. This new point marks the outer limit of the purse-string when tied, and thus permits us to fix on the inner limit necessary to produce the desired amount of anteversion of the uterus. (The round ligament and the bladder must be avoided in passing the purse-string; when the purse-string is tied the raw edges of the incision should have been buried.) If, when the purse-string is tied, the uterine anteversion is found insufficient, it may be readily increased by the same suture either by taking in the uterus near the cornu or by taking a fresh bite farther outwards in the broad ligament. It is convenient to work from the side (of the patient) opposite to the round ligament being dealt with. When the operation is completed a narrow raised fold of the broad ligament is noted extending across the utero-vesical interspace; this can prove in no way a detriment to the patient.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

A POSSIBLE CASE OF BRONCHO-PULMONARY SPIROCHAETOSIS.

In the discussion on the differential diagnosis of pulmonary tuberculosis at the Glasgow meeting of the British Medical Association Dr. James Lawson referred to broncho-pulmonary spirochaetosis, and instanced a possible case under observation at Tor-na-Dee Sanatorium. The results of further investigation of this case are, I think, worthy of record, since the evidence is conflicting and leaves the diagnosis doubtful.

The patient was a lady aged 40, who had never been abroad except for a year at school in France and Switzerland. Down to five years before admission she had always had good health except for otitis media as a child. At the age of 33 she had whooping-cough, which left her with a cough and a little sputum for about four months. The sputum was streaked with blood once; it was repeatedly examined for tubercle bacilli, with negative results. She had an attack of influenza four years later, which was followed by a persistent cough with sputum, and on three occasions at intervals of about three weeks she had small but definite haemoptyses. She was seen by a consulting physician, who diagnosed pulmonary tuberculosis and advised sanatorium treatment.

There was no history of tuberculosis in her blood relations, but her husband had died of pulmonary tuberculosis six years before her admission. She complained of a rather troublesome cough with copious sputum, and slight huskiness of the voice on waking. The sputum was copious, thin, and very fetid, and on standing separated into an upper clear watery layer and a lower layer of yellowish-grey pultaceous material. Repeated examination by ordinary and concentration methods of twenty-four hours' samples failed to reveal tubercle bacilli, but numerous septic organisms were present, along with large numbers of spirochaetes which at first we thought were the spirilla of Vincent's angina, since she had severe pyorrhoea alveolaris, and the tonsils were a little enlarged, congested, and cryptic. The mucous membrane of the nose and nasopharynx looked unhealthy, but the larynx was normal. The physical signs in the lungs were those of definite infiltration (with râles) of the upper half of the right lung, and doubtful infiltration (without râles) at the left apex. The *x* rays confirmed these findings, and in addition showed some calcareous deposit at the roots of both lungs, with two small dilated bronchi near the root of the right lung. Her general condition was quite good, and there was practically no systemic disturbance except slight tachycardia. The blood was normal, and the Wassermann reaction was negative.

A provisional diagnosis of pulmonary tuberculosis, with spirochaetal infection of the mouth and fauces, was made. After local treatment the consulting rhinologist declared the upper air passages healthy, and dental treatment was equally successful in clearing up the septic condition of the teeth and gums, but there was practically no diminution of the fetid sputum, and the spirochaetes were as numerous as ever. We therefore formed the opinion that broncho-pulmonary spirochaetosis was a possible diagnosis. An independent bacteriologist was asked to examine the sputum, and he reported that "the spirochaetes are certainly not *S. pallida*, and if infection from the mouth can be excluded it is very possible that they are of the type described by Castellani; they closely resemble the spirochaetes described by him, but similar organisms may be found in the mouth, so that it is not possible to say definitely that they are pathogenic in this case."

The von Pirquet test was inconclusive, only a slight reaction being obtained. Injection of samples of the sputum into guinea-pigs gave negative results as to tuberculosis, and no lesions of any sort were produced. Two successive samples of blood were sent to Drs. Gosse and Punch for the complement fixation test, and both were "*positive*."

On the above evidence it is very difficult to make an exact diagnosis, but taking all the facts into consideration I think it

is probable that the case was one of arrested pulmonary tuberculosis, with secondary infection of the mouth, upper air passages, and possibly the lung, with septic organisms and spirochaetes.

The spirochaetes were of the type described by Castellani as producing the pathological condition named by him "broncho-pulmonary spirochaetosis," and may have been responsible for the peculiar fetid sputum. The positive complement fixation results were unexpected by us since, according to Dr. Gosse,[1] a positive result is "an almost infallible guide to the presence of active tuberculosis," though he qualifies this by saying that "the blood may give a positive test for perhaps a year after the disease is arrested." Is it possible that Castellani's spirochaetes may, like *S. pallida*, sometimes produce substances in the blood which fix complement in the presence of tuberculous antigen?

The patient improved greatly under treatment with arsenic and antiseptic inhalations, but on discharge there was still a small quantity of sputum containing spirochaetes, and at the apex of the right lung a few râles after cough.

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ESERINE POISONING PRODUCED BY INTRAVENOUS INJECTION: RECOVERY.

THE following case, which was seen by me recently, is of interest:

M. S., aged 32, was admitted to the London Hospital suffering from psoriasis. Inadvertently the patient was given a quarter of a grain of eserine sulphate in 15 minims of water by intravenous injection. Within a minute she became unconscious, with laboured breathing, imperceptible pulse, and cyanosis, fibrillary twitchings of all muscles, and wide dilatation of the pupils. There was incontinence of urine and faeces, and a great flow of saliva, and the throat and larynx were filled with secretion. Immediately the mistake was recognized an injection of atropine 1/100 grain and strychnine 1/60 grain was given, and oxygen was administered by inhalation. An hour later the pulse could just be felt, the throat was clearer, but breathing was still laboured. A second injection of atropine 1/100 grain was given, and the inhalation of oxygen continued.

Shortly afterwards the patient began to regain consciousness, but it was at least an hour later before she spoke. She complained of deafness and blindness. The breathing was now calm and deep, and the twitchings had almost stopped. The pulse was weak and irregular. The oxygen was stopped; saline (2 pints) was injected by the rectum and retained. Gradually the sight and hearing returned, and the general condition steadily improved. The following day the patient felt rather weak, but was otherwise none the worse.

The course of the psoriasis appeared not to be affected by the incident.

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COLLOIDAL GOLD FOR THE LANGE TEST.

IN view of the difficulties so often experienced in the preparation of reliable samples of colloidal gold for the Lange test and the consequent limitation in usefulness of this valuable reaction, it may be of service to describe a greatly simplified technique for the preparation of the reagent, which in our hands is giving encouraging results.

Into a perfectly clean hard-glass flask, washed out several times with distilled water, take 100 c.cm. of distilled water and 1 c.cm. of $AuCl_3$,NaCl; bring to the boil, and from a Dreyer pipette add ten drops of 1 per cent. formaldehyde (2½ per cent. formalin); remove the flame to the edge of the wire gauze and from another Dreyer pipette add sixteen drops of a 2 per cent. solution of K_2CO_3, and then at intervals of fifteen seconds add one or two more drops—eighteen in all usually suffice, red streaks appearing at the seventeenth drop, converted at the eighteenth into a smart blush; cease now. There is no need to shake.

The sample as it cools in the flask will assume a rich old-rose colour to transmitted light, throwing on to white paper a red colour with a violet tinge; it will have a marked fluorescence to reflected light; 5 c.cm. of it will be rapidly decolorized by 1.7 c.cm. of a 1 per cent. solution of NaCl; and it will give luetic and paretic curves with appropriate positives and negative results with known negatives.

The reagent should not be used quite fresh; we do not use a sample prepared more recently than the evening before. On the other hand, the sample may not keep more than a week or ten days; hence the advantage of preparing it in small quantities.

The usual precautions as to scrupulous cleanliness of apparatus are taken, every single piece of apparatus used being reserved for this work and no other. Triple distilled water is not used; we use a fresh sample of water distilled in a copper retort which has been in use for some time.

Central Laboratory, Ministry of Pensions. TEMPLE GREY, M.B.

[1] BRITISH MEDICAL JOURNAL, October 21st, 1922, p. 741.

Reports of Societies.

GENERAL PARALYSIS.

THE DISCOVERY OF GENERAL PARALYSIS.

AT the ordinary quarterly meeting of the Medico-Psychological Association of Great Britain and Ireland, held on November 23rd at the Bethlem Royal Hospital, London, the President, Professor G. M. ROBERTSON of Edinburgh, read a paper on the discovery of general paralysis, from Haslam to Bayle (1798–1822). On November 21st, 1822, he he said, a young man named A. L. J. Bayle presented a thesis for the Doctorate of Medicine to the Faculty of Paris, entitled *Recherches sur les maladies mentales*. In it he recorded the opinion that "general and incomplete paralysis" and disorder of the mind, developing side by side, were caused by chronic arachnitis; in other words, that these two groups of phenomena were the associated symptoms of a definite disease having a distinctive pathological anatomy. This was an opinion which had never been expressed before by anyone, and it had since been proved in its essential features to be true. The disease was the one now generally known as general paralysis of the insane. According to Baillarger, the recognition of the association of these two orders of symptoms signalized the greatest advance ever made in the history of mental disease.

The first case of undoubted general paralysis recorded in medical literature was described in 1798, by an Englishman named John Haslam, who was apothecary to Bethlem Hospital from 1795 to 1816, and was at one time President of the Edinburgh Royal Medical Society, and one of the original members of the Medico-Psychological Association of Great Britain and Ireland. Haslam was an acute observer, and he had the gift of literary expression. Less than three years after entering Bethlem Hospital he published the first edition of his *Observations on Insanity*. Professor Robertson then quoted verbatim Haslam's celebrated Case XV.

It was that of a man aged 42, whose illness suddenly developed on a hot day while he was working in the garden. Some years previously he had travelled over the greater part of Europe with a gentleman, and after the onset of his illness he sometimes conceived himself the King of Denmark, at other times the King of France. Though lacking education, he professed himself a master of all the dead and living languages, and he believed he had some recollection of having come over to this country with William the Conqueror. He was irritable and quarrelsome. After ten months in the hospital he became tranquil, relinquished his absurdities, and was "discharged well" in June, 1796. But in six weeks he relapsed and was readmitted. He now had a paralytic affection, and his speech was inarticulate. Then he became stupid, his legs swelled and afterwards ulcerated, his appetite failed him, he became emaciated, and died. Haslam made a *post mortem* examination, and minutely described all that he found.

Probably, Dr. Robertson said, the man was infected with syphilis while travelling abroad, and he had the typical delusions of grandeur. Even at that early date Haslam believed that madness was always connected with disease of the brain and of its membranes. The great Pinel spoke very highly of Haslam's character.

In Paris the clinical symptoms of general paralysis were undoubtedly discovered by Esquirol, and in 1826 Bayle and Calmeil gave a complete picture of the symptoms, the course, and the naked-eye pathology of general paralysis. It was Pinel who insisted on a study of the symptoms of insanity on strictly scientific lines, and on a daily visitation of the patients, and a record of their symptoms and the progress of the cases. He appeared to have practised towards the patients the greatest consideration and kindness. Paris was in a fortunate position for the study of the disease, as at this period it possessed three large mental hospitals, and some years after the Napoleonic wars there arose a large crop of cases of general paralysis; no doubt there was a large infection of the soldiers with syphilis while passing through the various European countries. Still no one seemed to have thought of syphilis as a cause of general paralysis; the

latter was rather regarded as resulting from anxieties and alcoholic and venereal excesses.

Esquirol's thesis on the emotions, in 1805, recorded the existence of paralysis among insane persons, and said paralysis was a common complication of insanity, and when it was present added to the seriousness of the prognosis. His ideas, as set forth in the article on "Dementia" in the *Dictionary of Medical Sciences*, showed a conception of general paralysis nearer to the truth than that of Pinel. He certainly seemed able to diagnose the condition with precision.

At the Salpêtrière was a man only 25 years of age, Georget, who published a book on madness (*De la Folie*); it contained the most complete clinical picture of general paralysis so far given by any of Bayle's precursors. The disease was now named "chronic muscular paralysis." Down to this time the disease had been studied mainly from the clinical side, but Pinel, in 1800, touched on pathology. He considered that the primitive seat of insanity generally was in the region of the stomach and intestines, that it was from there the disorder of the intelligence propagated itself. Esquirol was a believer in the doctrine of sympathy.

A. Foville and J. B. Delaye, who were working at the Bicêtre mental hospital, won Esquirol's prize for an essay on the causes and the seat of mental diseases. They concluded that the grey matter of the convolutions was the organ of the intelligence, and that the white matter and the basal ganglia presided over locomotion; they also said that the disorders were of the brain, the organ of the mind. But there was no reference to lesions believed to be distinctive of and peculiar to general paralysis. Delaye believed that a particular modification of the white matter of the brain was the organic alteration which produced paralysis; whereas Bayle thought the primary change was a chronic arachnitis, and the former worker was the first to employ the term "general paralysis" for the disease.

Bayle commenced to study medicine in Paris in 1815, when he was but 16 years of age, and he concluded that mental diseases depended for their elucidation on anatomical and pathological researches. He performed over 400 *post-mortem* examinations in less than five years. He gave very minute descriptions of the changes he found, and added one or two symptoms to the disease; in fact he gave an accurate and almost complete description of the pathological anatomy of general paralysis. The inflammation of the meninges which he discovered he named "chronic arachnitis." Professor Robertson considered that the French were amply justified in calling the disease "la maladie de Bayle." In spite of illness Bayle also published a treatise on maladies of the brain and its membranes, a great classic, for which the Academy of Sciences awarded a special prize. Professor Robertson spoke of the commotion in medical circles which followed Bayle's contribution, and of the plain-spoken criticisms which emanated from Pinel and Esquirol.

In conclusion, Professor Robertson said that the hundred years had produced a band of hard-working and devoted followers, who had assisted to draw aside the veil which concealed the most terrible disease which afflicts humanity. Their successors had discovered its cause, and it remained for the present generation to either discover a remedy for it or to prevent it altogether.

On the motion of Dr. PERCY SMITH, a cordial vote of thanks to the President for his address was accorded by acclamation.

THE TREATMENT OF GENERAL PARALYSIS BY MALARIA, AND THE USE OF SPEECH INSCRIPTIONS FOR EARLY DIAGNOSIS.

Dr. EDWARD WHEELER SCRIPTURE said that there were on record undoubted cases in which general paralysis seemed for a time to have been cured, so as to enable the patients to return to their work; and although they afterwards relapsed the fact seemed to indicate the possibility of stopping the progressive paralysis. Attempts which had been made with mercury and salvarsan had not been encouraging. Tuberculin and mercury, used in the way described at the Buda-Pesth Congress in 1909, were said to have produced good results. The tuberculin treatment was a substitute for the method by which nature had been known occasionally to cure general paralysis—namely, by adding a fever to the disease. Wagner-Jauregg, in 1917, inoculated nine cases with tertian malaria, and six of them showed favourable results, three being still at work more than four years afterwards and showing no signs of the disease. For the inoculation, blood was taken from the vein of an untreated patient during the fever, and of this 2 to 4 c.cm. were injected under the skin of the back of the next paralytic. As a rule, the patient was allowed to have eight chills, after which the malaria was cut short by giving, for three days, twice a day, 0.5 gram of quinine bisulphate, and then for fourteen days once a day 0.5 gram. In nearly all cases there was no fever after the first dose. At the same time neo-salvarsan injections were carried on, an injection being made once a week for six weeks, the neo-salvarsan acting not only against the syphilis but the malaria also. Latterly silber-salvarsan was used instead of neo-salvarsan. The results had been very favourable, and the clinical signs of general paralysis were said to have often completely disappeared during the treatment. Incomplete cures with persistent marked abnormalities occurred in fourteen cases, the disease having endured for several years. Professor Wagner-Jauregg considered the malaria treatment was the best, but that where this could not be applied the tuberculin treatment was to be recommended. Emphasis was placed on the patients being treated if possible early in the disease, and Dr. Scripture described the method of making speech inscriptions, which served to reveal the earliest abnormalities of speech and present them in graphic form. The patient spoke into the mouthpiece of a wide tube leading to an apparatus which registered the puffs of air and the waves of speech on a drum; these records were then studied under the microscope. The cases of general paralysis showed the most varied bulbar, cortical, and mental signs, and of all degrees of severity. One sign was never missing in general paralysis—namely, asaphia (lack of precision in regard to type). With the normal person there was no variation in his speech, in the relative energy of the explosives, etc., but in the general paralytic this uniformity was lacking. The absence of asaphia could not yet be asserted to be a proof of the absence of general paralysis, though it was highly probable.

The PRESIDENT, in thanking Dr. Scripture for his paper, said that the vast majority of cases of the affection were diagnosed with great ease, but every now and then one was seen which, in spite of every care, could not be labelled general paralysis as against ordinary tertiary syphilis, and this additional means of testing, if its value were confirmed, would be a valuable addition. He would like to try the treatment of general paralysis by malaria in some cases, but he did not at present feel convinced on the subject. Still, the course of the disease was so relentlessly downhill that any promising treatment should be tested.

SURGICAL TREATMENT.

A MEETING of the Surgical Section of the Royal Academy of Medicine in Ireland was held in the Royal College of Physicians on November 17th, with Sir ARTHUR CHANCE in the chair, when the President, Sir WILLIAM I. DE COURCY WHEELER, delivered his opening address, entitled, "What makes for success in surgical treatment." He referred to the part played in the development of Irish surgery by his predecessors in the chair, and to the presidential address of his father in 1883. In a plea for better team work in surgery, he emphasized the fallacy of sending specimens for report to a pathological laboratory at a distance, the surgeon never seeing the pathologist and the pathologist never seeing the patient. He described visits to various clinics in Europe and America, and thought that team work could be carried on without extra staff and without extra cost, to an extent sufficient to change antiquated and defective into modern and safer methods. He urged the necessity for travel for those about to undertake hospital appointments.

The preparation, the "ritual of the operation," and the after-treatment of patients were then discussed. It was his own practice to give patients alkalis for several days before operation, and glucose was added when any anxiety was felt. No laxatives to cause purging were ever given to patients preparing for operation, and no enema was given on the morning of operation. As a rule, surgical cases free of fever and non-drainage cases were allowed up two or three days after operation. All reports went to show that the healing of the wound was not interfered with by early movement; that probably the danger of pulmonary embolism was rendered less, and ventral hernia did not occur. Very hot operating theatres were condemned, and he advised that the head of the patient should be covered over with a blanket to prevent the inhalation of cold unfiltered air while being taken from the theatre to the wards. Sir William Wheeler said that he had experienced the calamity of pulmonary embolism in four cases. The part played by morphine,

the Trendelenburg position, the Fowler position, and the immunity of children were discussed. Moynihan's opinion was quoted to emphasize that all grades of infection might occur in wounds without the actual formation of pus. The aim should be the healing of a wound without any local or general reaction whatever, followed by a convalescence with little or no pain or discomfort. Union by first intention could be easily obtained, but that might be far from the finality of perfection. The combination of local anaesthesia with general anaesthesia as a routine in surgery was urged. He had adopted that method for almost the past twenty years.

Dr. LOUIS CASSIDY thought that what was needed in Dublin was an institution to deal purely with problems of research. He appealed strongly to the President and the other leaders of the profession to take steps to try and remedy this defect. He himself hoped to establish a biochemical laboratory at the Coombe Hospital, which would help towards the solution of those problems which demanded research work.

Dr. T. T. O'FARRELL said that in regard to team work where they failed in Dublin was in applying it. A pathologist was sent a specimen, but was given very few instructions, and knew nothing about it except what the microscope showed. He then sent in his report, and never heard anything more about the case. In his opinion the pathologist should be told how the case progressed. Dr. PERCY KIRKPATRICK said that, speaking as an anaesthetist, the first thing that made for success at an operation was that everyone concerned should remember that they were treating a sick person. He thought that the anaesthetist should be given an opportunity of examining the patient before the operation. Very often the anaesthetist knew nothing about the patient, and that did not make for success in surgical operations.

Dr. T. G. MOORHEAD thought that surgeons did not realize, in the same way as physicians, the extremely important part an operation played not only in a patient's physical welfare, but also in his mental welfare. In every case undergoing surgical treatment, except minor operations, it was essential for the patient to take things easily for three or four months at least. An operation was a shock to the nervous system. A patient made up his mind to be operated upon, and then was not given full time to recuperate, and so a great many people suffered from neurasthenia. Nearly every day he came across patients suffering from post-operative neurasthenia. Dr. MILNE HENRY said that combined forethought should be used in every case, and that every minutest detail should be thought over before operation.

Sir ARTHUR CHANCE wondered whether it was well for them to be so well satisfied with their work. They heard great praise of Irish surgery, and he wondered if this praise was really deserved. He would like to know if there was any team work done in Ireland. He believed that isolated team work was done, but that was not his conception of real team work. One point about operations was the after-result. Was any genuine inquiry made in the majority of cases as to the progress after operation? He did not think there was.

THE ENTERIC-SALMONELLA GROUP OF BACTERIA.

THE Pathological Section of the Royal Academy of Medicine in Ireland met on November 10th, when the President, Dr. W. D. O'KELLY, read a presidential address entitled "Some observations on the enteric-salmonella group of bacteria." He reviewed the position of the more important members of the salmonella and enteric groups of organisms in the light of recent work, and expressed the opinion that the trend of English bacteriologists was towards the grouping suggested by Tenbroek in America, while he thought that German workers were moving in the same direction. The great difficulty with regard to members of the salmonella group was to apportion the relative importance of cultural and serological differences, and also to determine how far varying degrees of virulence for animals assisted in the differentiation of the organisms concerned. Was, he asked, Hirschfeld's *B. paratyphosus* C to be classed with *B. suipestifer*, with which it was serologically identical, or with Schottmüller's bacillus, with which it corresponded in its fermentation reactions, or with the paratyphoids of animal origin, on account of its agreement with the latter organisms in cross-immunization tests against *B. suipestifer*? He suggested that the two groups of *B. suipestifer* described by Andrewes and Neavl corresponded to "super-" and "sub-strains" which Schütze had worked out. Instances of the Gaertner and Aertrycke organisms causing affections other than gastro-enteritis were recalled, and stress was laid on the fact that the enteric-salmonella organisms were more frequently responsible for affections of the respiratory tract than was hitherto believed. The importance of such cases in the search for the cause of an outbreak was emphasized, and the difficulty of isolating the organisms under review from the intestines of carriers was dealt with. The employment of larger amounts of faeces in fluid media by enrichment methods was advocated, and it was considered that the urine should be investigated, and perhaps also the sputum. The difficulties were increased by the occurrence of atypical varieties such as non-motile typhoid bacilli and the mucoid paratyphoid bacilli described by Walker and Fletcher. Even sluggish fermenters gave rise to a good deal of unnecessary work. These atypical varieties had been met with in "raw" strands as well as amongst stock laboratory cultures. The time had come for settling some, if not all, of the points raised, and the hope was expressed that Irish bacteriologists would devote some of their time to the solution of these problems.

Dr. BIGGER said that with reference to the sugar test he thought that the great difficulty was in getting many of the rarer materials in a pure state. If one relied on chemical tests one organism alone was found—namely, paratyphoid. It was only when serological tests were introduced that one could distinguish between paratyphoid A and paratyphoid B, and later between them and the other members of the group.

Dr. O'FARRELL and Dr. WIGHAM also spoke, and Dr. O'KELLY replied.

THE BLADDER IN GYNAECOLOGICAL CASES.

A MEETING of the North of England Obstetrical and Gynaecological Society was held at Sheffield on November 17th, with the President, Mr. HAROLD CLIFFORD (Manchester), in the chair, when Mr. ALFRED GOUGH (Leeds) read a paper on the bacterial flora of the bladder in gynaecological cases.

Mr. Gough said that his observations were based on the examination of catheter specimens of urine from 100 unselected cases in which no complaint of urinary symptoms had been made. The specimens were obtained by the routine catheterization of patients before operation and were examined in the following manner: With the least possible delay a single drop of urine was placed in a tube of agar culture medium and after incubating for forty-eight hours the number of colonies was noted; the deposit obtained by centrifuging was also submitted to microscopic examination. No search was made for tubercle bacilli, gonococci, or anaerobic organisms, but nevertheless the limited inquiry had yielded results of some interest. Of the specimens examined, 30 were sterile, in 39 the number of cultures was under 10, in 21 under 100, and in 10 over that figure. The organisms found were the *Staphylococcus albus* in 56 specimens, the diphtheroid bacillus in 17, coliform bacilli in 12, and a streptococcus, the *Staphylococcus aureus*, and *Bacillus proteus* in one each. Taking the 10 cases where the number of cultures was over 100, coliform bacilli were found in 8, this being in accordance with the predominant part played by these organisms in the causation of the more severe infections of the urinary tract. His numbers were too small to justify an analysis of different morbid conditions, but as a general rule most organisms had been found in cases of prolapse and pelvic infection. The only accurate and scientific method of determining the bacterial content of the urine in the bladder was to withdraw a specimen with a syringe through a suprapubic puncture. Catheter specimens were always liable to be contaminated during the passage of the instrument, and this fact might account for some of the cases in which small numbers of cultures had been found. It would not, however, explain the 10 cases where the cultures were numerous, so he felt justified in concluding that organisms were present in the bladder in 10 per cent. of gynaecological cases without urinary symptoms. He thought this would explain many of the cases where cystitis followed operation, as the retention of urine frequently met with after operation, and the diminished resistance of the patient, would give an opportunity to germs already present. Similar considerations would account for the occurrence of cystitis and pyelitis during pregnancy and in the puerperium.

Reviews.

THE THYROID GLAND.

PROFESSOR CRILE and his associates intend to publish a series of volumes on clinical subjects in order to present the knowledge by which the theory and practice of the Cleveland clinic is guided from day to day. "Both theory and practice, therefore, will be constantly subject to revision, and possibly reversal of opinion."

This first volume is on the thyroid gland.[1] It is a remarkable product of the work of fifteen men co-operating as a team and dominated by a refreshingly inspiring mind. The general outlook on the subject is always wide, and may be illustrated by the following three excerpts from the introduction written by Professor Crile:

1. "We wish," he writes, "first of all to express our sense of the obligation of medicine to Theodore Kocher in Europe for the secure foundation laid by him for surgery of the thyroid gland."
2. "Endemic goitre is a geologic deficiency disease due to a lack of iodin in the organism."
3. "We shall offer the general hypothesis that the body is an electro-mechanical mechanism in which the electric conductivity, hence oxidation, is controlled by the thyroid."

All will agree with No. 1, we believe No. 2 is not the whole story, whilst No. 3 is one of those "Crilean flashes" we look for from the author of *Mechanistic Views of Life and War*.

Although the volume starts its flight "as an ephemeral publication representing to-day's view-point of this clinic," there are in it many valuable contributions which will help to lighten the anxieties of those concerned (the surgeon, anaesthetist, and nurse) in performing operations on the thyroid gland, more especially for cases of hyperthyroidism.

Full details are given of how to guard "these sensitized patients" against "psychic, traumatic, biochemic, and anaesthetic stimuli," by pre-operative management, in which the nurse plays an important part; full instructions are likewise given as to the arrangement of instruments and also for the post-operative treatment. There is one statement which if given as an order by a general in charge of an army during battle would forthwith mark him as *great*, and that is—stop operations when matters go against you. "In performing thyroidectomies, the extent of the operation will depend entirely upon the condition of the patient, and therefore he may be sent back to his bed at any moment . . . with the wound dressed open with flavin gauze."

In the Cleveland clinic preliminary ligations are made in about 40 per cent. of the cases, and are performed in the patient's bedroom on his own bed without his being informed of it beforehand. The patient is daily introduced to the use of the anaesthetic "nitrous oxid-oxygen," and on the psychological opportunity the operation is done. "The average reaction following ligation is practically the same as the reaction which follows admission to a hospital." Ether as an anaesthetic is tabooed.

On the burning question of treatment in hyperthyroidism, "*x* rays *versus* surgery," Crile favours the latter because "surgery now undertakes every case; the mortality is practically eliminated; much time is saved, and a more certain cure is achieved." "Since the adoption of the methods described in this volume we have performed 1,783 thyroidectomies, including 1,022 thyroidectomies for exophthalmic goitre, with a mortality of 1.4 per cent.; and 783 ligations, with a mortality rate of 0.76 per cent. No case has been rejected as inoperable, although some have been practically *in extremis*, with oedema of the extremities and with ascites." A truly remarkable achievement when one considers past records of operations in these perplexingly dangerous cases.

It is interesting to note that the plan of treatment so carefully and fully described in this volume is founded on experiments and on clinical studies of 3,535 thyroidectomies, among which 1,958 were for exophthalmic goitre. Although this is a big record of cases in one clinic, from our point of view, nevertheless it recalls a letter I (the reviewer) received from Dr. Albert Kocher of Berne some ten years ago, containing a postscript requiring no comment: "My father yesterday performed his 5,000 goitre operations. 12, iii, 1912." There is an interesting chapter on the "rôle of the radiologist in diagnosis of goitre," which is illustrated by many excellent figures well reproduced on thick paper.

A chapter on the "value of basal metabolism studies in goitre" brings this subject quite up to date; men of the old practical apprenticeship school will read with pardonable self-satisfaction that "the increase in pulse rate represents a fairly accurate index in lieu of actual metabolic measurements."

In connexion with the prevention of goitre, about which the reader would have been glad to hear more, reference is made to the use of iodine, sodium iodide, and mercuric iodide; as to this I cannot, I think, do better than quote the following passages from a letter I have received less than a couple of months ago from Dr. Albert Kocher, showing that the late Professor Kocher was of opinion that iodine was of value as a prophylactic, and was in the habit of using it for this purpose some forty or more years ago.

"As to the questions about goitre etiology you want to know, it is quite true that my father believed that the cause of goitre is either a hitherto unknown micro-organism, or more probably a chemical agent mostly transferred by water and made inoffensive by boiling the water. That is why he proposed, forty years ago, to boil all the drinking water, especially at the schools, to prevent goitre. But at the same time, forty years ago, he proposed to give the children twice or three times a year during some weeks a small dose of iodine to prevent goitre. He had then a malt preparation made with iodine and iron. The proof is that we were given it as boys three times a year, and at the same time were not allowed to drink any more boiled water at home or at school. The result is that we three brothers have absolutely normal thyroid glands, in size and consistency like the thyroid of Spaniards, etc., although my mother, grandmother, grandfather, uncles and aunts had goitres. On the other hand, I do not believe that it was my father's idea to give the school children the whole year round such doses of iodine as are given in America, and also here. . . . I believe this is dangerous, because it can give Graves's disease."

I have seen much of the late pioneer of our knowledge of thyroid gland surgery, the man who is commemorated in his native town (Berne) by the Theodor Kochergasse, and many times was told that goitre is a water-borne disease due to one of two causes, either (1) a subtle chemical compound which disappears on boiling, or (2) an elusive micro-organism, and he felt confident that one day the one or the other would be run to earth.

J. LYNN-THOMAS.

[1] *The Thyroid Gland.* Edited by Amy F. Rowland. Clinics of George W. Crile and Associates. Philadelphia and London: W. B. Saunders Co. 1922. (Med. 8vo, pp. 288; 105 figures. 21s. net.)

DISEASES OF THE BLOOD, KIDNEYS, DIGESTIVE ORGANS, AND METABOLISM.

WE have received two volumes (IV and V) of the *Précis de Pathologie Médicale*,[2] which is being issued in Paris by the firm of Masson. Inasmuch as one of these volumes contains 628 pages and the other 800, it may be that the word "précis" has changed its connotation in France while retaining it in this country. The two volumes deal respectively with diseases of the blood, blood-forming organs, and kidneys, and diseases of the alimentary tract and metabolic disorders.

The section on diseases of the blood and haemopoietic system is by MM. P.-EMILE WEIL and MARCEL BLOCH. It is divided into two parts, the first concerned with biological and the second with clinical aspects. The important part played by the liver in blood formation in the adult, especially its influence on coagulation, is emphasized. The clinical pictures of the various types of anaemia, it is needless to say, are well drawn, but the paragraphs on treatment are, on the whole, sketchy and disappointing. X-ray or radium therapy is advised in myelocytic leukaemia in "large doses," but no reference is made otherwise to strength or frequency of application. The skin lesions in lymphatic leukaemia are fully detailed and well illustrated. But our French friends have no greater success in differentiating the various types of lymphatic glandular enlargement than have British and American writers.

In discussing the site of elimination in the kidney of the various constituents of the urine, M. VALLERY-RADOT, who is responsible for this section, expresses the view, in spite of a footnote reference to the work of Richards in Philadelphia, that secretion of urine takes place entirely in the convoluted tubules, the glomeruli being merely pumps. The discussion of the various theories as to the causation of orthostatic albuminuria is followed by the warning that in certain cases it may be the first sign of a developing nephritis or the last

[2] *Précis de Pathologie Médicale.* Tome IV: *Maladies du Sang et des Organes hématopoiétiques*, par MM. P.-Emile Weil et Marcel Bloch *Maladies des Reins*, par M. Pasteur Vallery-Radot. (Cr. 8vo, pp. 628 150 figures, 4 plates.) Tome V: *Maladies de l'Appareil digestif et de la Nutrition*, par MM. Marcel Labbé et G. Vitry. (Cr. 8vo, pp. 800; 316 figures, 2 plates.) Paris: Masson et Cie. 1922. (Price of each volume —paper, fr. 20; cloth, fr. 25.)

stage in the process of healing, but we are not told the globulin-albumin ratio in these circumstances. The subject of nephritis is well handled and it is clearly pointed out that the dominant feature of the disease is due either to chloride or to nitrogenous retention, the latter usually associated with a raised blood pressure, the former with oedema. In discussing urea retention, the author mentions that it may occur in conditions other than nephritis—in cardiac disease, lead poisoning, icterus gravis, and urinary obstruction among others—yet in such conditions a pathological state of the kidneys is surely the rule. We are told that in nephritis a blood urea between 1 and 2 grams per litre indicates death within two years; above 2 grams several weeks or months only will elapse; while above 3 grams death cannot be long delayed. The author urges that the term "uraemia" should be abandoned, and the syndromes designated "chloride retention," or "nitrogen retention," or "hypertension," as the case may be.

Diseases of the alimentary tract, including the pancreas, peritoneum, and liver, metabolic disturbances and "deficiency diseases" are well expounded in volume V by MM. MARCEL LABBÉ and G. VITRY. The work includes descriptions of several conditions usually regarded as surgical rather than medical in this country, and many surgeons would profit by reading Marcel Labbé's lucid account of malignant disease of the intestine, of haemorrhoids, and of fissure.

Each section contains a review of the anatomy and physiology of the organ under consideration, a description of methods of examination, and an account of the general etiology and main symptoms of disorder of the part, before the particular diseases are discussed. As in the previous volume, the paragraphs on treatment are apt to be disappointing, and methods in advance of those described which have stood the test of time in this country—for example, Lenhartz diet for peptic ulcer and the Graham-Allen treatment for diabetes mellitus—are not mentioned.

These two volumes are intended for students reading for examination and for practitioners; they are well illustrated, and contain more detail than an English student requires for the qualifying examination in medicine and medical pathology, but those reading for higher examinations cannot fail to find them of great assistance. We look forward with interest to the publication of the remaining four volumes in the expectation that the high standard of excellence reached here will be maintained.

THE TECHNIQUE OF PSYCHO-ANALYSIS.

THOUGH the literature of psycho-analysis has assumed considerable proportions, there has hitherto been no book which provides a clear and adequate account of the practical details of analytical therapy. Dr. DAVID FORSYTH aims to supply this want in a small volume entitled *The Technique of Psycho-analysis*.[3] The book is based upon the author's experience of psycho-analytical therapy, and it supplies in a compact form the practical information it is essential those who propose to take up the method of treatment with which it is concerned should possess. The difficulties which confront the would-be analyst are not minimized nor concealed, and it may be that some readers will feel that their vocation lies in other directions before they have reached the end of the volume. The initial difficulties concern the analyst himself, a topic which is discussed in the opening chapter. It is shown that in psycho-analysis the physician must assume an attitude towards his patients which involves a complete reversal of the habits and procedure acquired in ordinary practice. Thus he must be impersonal, passive, and no more than a shadowy figure in the background to whom the patient can reveal his temperament with complete freedom. As Dr. Forsyth observes, such an attitude of emotional detachment is more easily written about than achieved, and he considers that the analyst must acquire a knowledge of himself by being psycho-analysed, or, if this is not feasible, by psycho-analysing himself, in order to deal adequately with his patients.

The second chapter deals with the various details and precautions which must be heeded if the analytical work is to go forward in the most favourable circumstances. These details are included under the heading, "The pre-requisites of the treatment," and amongst the subjects discussed are the duration of the treatment (at least several months) and the type of case in which a favourable outcome may be anticipated. The remainder of the book deals with the analytical work itself, and in successive chapters the various stages of the treatment are described up to the termination of the analysis. The book is written with commendable clearness and brevity, and the author would appear to have achieved his aim and provided a useful guide to the practice of psycho-analysis.

[3] *The Technique of Psycho-analysis.* By David Forsyth, M.D., D.Sc.Lond., F.R.C.P. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1922. (Cr. 8vo, pp. viii + 133. 5s. net.)

INJURIES OF PERIPHERAL NERVES.

DR. BYRON STOOKEY'S *Surgical and Mechanical Treatment of Peripheral Nerves*[4] is a welcome addition to the list of truly authoritative monographs which have appeared during recent years in response to the stimulus of the experience of the reconstructive surgery of the war. This work may be justly regarded as representing American views and teaching in this special surgical field, and amongst the younger American surgeons the author is pre-eminently fitted to undertake such an exposition. Considerable space is devoted to those anatomical and physiological considerations which form the basis of a rational surgical treatment of the various lesions of peripheral nerve trunks. Professor Carl Huber has contributed a chapter on nerve degeneration and regeneration which constitutes one of the most valuable sections of the book, although we must confess to a little difficulty in extracting a broad conception of these processes from the histological minutiae described.

In discussing the general principles of nerve repair the author has everywhere adopted a sane and judicial attitude. He writes more confidently perhaps than British surgeons of the efficiency of nerve grafts—particularly of the "cable" grafts which have proved so popular in the United States—but he is emphatic that anything short of end-to-end suture is at the best a most imperfect method of repairing a nerve injury.

The chapters dealing with the lesions of the individual nerves are well planned. It is interesting to note that in discussing the advisability of exploring the brachial plexus in cases of obstetrical paralysis the author's conservative advice runs counter to that of certain other American neurological surgeons—most notably Taylor and Sharpe. But Dr. Stookey will here receive the support of the majority of surgeons who have had an extensive clinical experience of this type of nerve injury.

The many beautiful illustrations throughout the book have been carefully selected from various sources, and in its production of this book Messrs. Saunders have shown no deviation from their usual high standard.

[4] *Surgical and Mechanical Treatment of Peripheral Nerves.* By Byron Stookey, A.M., M.D., Assistant Surgeon, New York Neurological Institute. Philadelphia and London: W. B. Saunders Co. 1922. (Sup. roy. 8vo, pp. 475; 217 figures. 48s. net.)

QUESTIONS AND ANSWERS FOR DENTAL STUDENTS.

SINCE few of those who superintend the education of dental students have sufficient leisure to converse with or question each one separately, and since on this account the needs of the dental student are not disclosed, nor his mind directed in the manner best calculated to facilitate his studies, Messrs. W. and A. T. BARRITT have compiled *Questions and Answers for Dental Students*,[5] hoping thus to stimulate in the student a desire for further knowledge.

That a teacher in a dental school should feel the need of such a book and write such a preface as is to be found in it is a serious indictment both of the teaching of dental students and of the dental curriculum. There are probably other dental teachers who share the uncomfortable feeling disclosed by the authors that the medical side of the dental student's education is seriously defective.

As has just been indicated, the scope of the book is limited to the medical side, and of that to such only as strictly applies to the mouth. The questions and answers are short and definite, and if the student be not spurred to inquire for further knowledge, at least he will have learned something. As a special example of a question which might spur to further inquiry we may quote, "Why does nature provide periods of rest during eruption?" with its answer, "To allow for recuperation and prevent exhaustion." A thoughtful student might ask whether nature has any need for recuperation during growth! He might also ask whether fluctuation

[5] *Questions and Answers for Dental Students: Dental Surgery.* By Wesley Barritt, O.B.E., L.D.S.Eng., and Alfred Templar Barritt, L.D.S. Eng. London: Henry Kimpton. 1922. (Cr. 8vo, pp. 177. 6s. net.)

is the peculiar property of a chronic alveolar abscess, and what is the meaning of the phrase, "The stimulation of the salivary secretion acts as a prophylactic and curative agent." He may also marvel at the structure of the tongue, which is described as "covered with a mucous membrane resembling the skin in structure, together with a corium, a layer of papillae, and a superficial epithelium."

Whether such a book as this will stimulate the thirst for knowledge or be taken as the source itself of knowledge depends on the individual into whose hands it falls; but the student who desires to learn will find in it many a peg whereon to fix his first chaotic impressions of medicine as applied to dentistry.

A DOCTOR IN THE ARCTIC.

DR. HARRIS has done well to edit for publication his late father's diary, for it tells a story of adventure and endeavour, of human endurance strained almost to the breaking point, worthy to rank with any narrative in the language. Dr. Charles Edward Smith was surgeon on board a whaler, and though many doctors have lived adventurous lives (the great war did not find the profession wanting, the only bars to the V.C. being bestowed on doctors, and was not Dr. Jameson of South African fame one of the most remarkable adventurers in history?) yet no man could have borne and survived greater privation than he. The tale, appropriately called *From the Deep of the Sea*,[6] is told with an unaffected simplicity which fits the elemental nature of the subject and throws into strong relief the conduct of a devoted band of men in circumstances of extremest hardship. When reading it the mind naturally flies to the immortal story of Scott and Oates and Adrian Wilson in the Antarctic, and one marvels that Dr. Smith and his companions did not suffer a similar fate in the frozen north.

On Monday, February 19th, 1866, the *Diana*, a screw steamer of 355 tons, set sail from Hull for the Davis Straits on a sealing and whaling expedition. From the outset bad weather was encountered. It seemed, in the words of the diary, "that the spirit of the north was determined to do his utmost to dishearten us or delay our approach to his icy regions." Ill luck continued to follow the expedition. The sealing was an absolute failure, the ship arriving too late, delayed by bad weather and the ice, and the whaling, although not entirely barren of result, was also disappointing. It is this failure to reap material reward that makes the spiritual qualities of the men of the *Diana* shine the more brightly. Theirs was a long continued struggle with imminent death. They were continually threatened with destruction by the elements, and, most terrible of all, by starvation. Once they had the mortification of seeing the ship which could have rescued them from a perilous place apparently abandon them to their fate. But in the end they survived, and eventually reached home, though in a most wretched condition, and their company sadly depleted by death. The diary breaks off suddenly before the completion of the voyage; the surgeon-diarist became too busy attending the sick and dying, the crew being smitten with scurvy. Not only this, he was one of the few able-bodied men remaining, and he took his share in the routine work of the ship.

It is impossible to do full justice to this book in a review; it must be read. Not only does it tell a story of almost superhuman endurance, moving as all such stories must ever be to a sea-loving people; it brings us into contact with an inspiring personality whose courage and simple faith never deserted him.

PHYSIOLOGY AND BIOCHEMISTRY IN MEDICINE.

PROFESSOR J. J. R. MACLEOD and his collaborators are to be heartily congratulated on the appearance of the fourth edition of their book *Physiology and Biochemistry in Modern Medicine*.[1] The third was reviewed in our columns so recently as April 30th, 1921. The fact that a new edition of so expensive a work has been called for in less than two years certainly demonstrates that the profession is taking a real interest in the application of physiology to medicine. This new edition, although the paging is unaltered from the previous edition, has undergone many minor alterations, and several chapters, such as those on the output of the heart, the acid-base equilibrium of the blood, and movements of the stomach, have been more or less rewritten. In the chapter dealing with pancreatic diabetes there is a short section on the important research work on "insulin" which is now in progress in Professor Macleod's laboratory at Toronto, as described by him in our issue of November 4th (p. 833). In this volume we have an excellent, readable, and most useful book.

[6] *From the Deep of the Sea.* Being the diary of the late C. E. Smith, M.R.C.S., Surgeon of the whaleship *Diana*, of Hull, edited by his son, C. E. Smith Harris, M.B., Ch.B., Surgeon, Cunard Steamship Company, late Surgeon-Lieutenant, R.N. London: A. and C. Black, Ltd. 1922. (Demy 8vo, pp. vii + 288; illustrated. 10s. 6d. net.)

[7] *Physiology and Biochemistry in Modern Medicine.* By J. J. R. Macleod, M.B., assisted by R. G. Pearce, A. C. Redfield, N. B. Taylor, and others. Fourth edition. London: H. Kimpton. 1922. (Roy. 8vo, pp. xxxii + 992; 243 figures, 9 plates. 42s. net.)

NOTES ON BOOKS.

INVESTIGATORS and administrators who are concerned in the problem of ankylostomiasis will welcome the exhaustive *Bibliography of Hookworm Disease*,[8] published by the International Health Board of the Rockefeller Foundation. When the Board first undertook the task of co-ordinating measures for the control of hookworm infection one of its earliest steps was the preparation of a bibliography which should be at the service of hygienists and administrators. In the compilation of the elaborate register now issued, which contains 5,680 entries, emphasis has been laid on the social and economic aspects of the disease and the efforts to control it rather than on the biology of the parasite. A short introduction gives an historical summary of the prevalence of the disease and the measures taken to treat it and bring it under control. The bibliography proper consists of 366 pages. This is followed by a key to the abbreviations of the titles of periodicals, an author index, and a subject and place index. The volume is well printed, and all workers in this subject will be grateful to its compilers.

George Joseph Smith was a vulgar scoundrel whose only claim to notoriety is the fact that he appears to have discovered a new method of wife murder. We say "wife murder," but in fact not one of his deluded victims was lawfully married to him, seeing that his first wife was alive and undivorced when he went through the forms of marriage with the murdered women. Unlike some other cases dealt with in former volumes of the Notable British Trials series, this one[9] presents no novelty except that of the method employed. To the medical jurist the chief interest lies in the establishment of the fact that it is easy to drown a healthy woman in a bath without any alarm being raised and without any marks of violence being visible on the body. In each of the three cases Smith followed the same system. Having persuaded his victim to marry with him he got possession of her savings, insured her life, or got her to make a will in his favour if she had disposable property. Having removed her from the neighbourhood where her friends lived he took her to consult a doctor with a story of headache and "fits." His success in persuading his "wives," who were previously in good health, that they were ill is remarkable. No evidence was called of his having given them drugs in order to produce symptoms. Soon after this the patient would be found dead in a bath. The doctor would give evidence of having been consulted shortly before death and of finding nothing *post mortem* inconsistent with epilepsy. The inquest and funeral were hurried over before the friends of the deceased could arrive on the scene. The "widower" pocketed the money and departed to perpetrate more seductions, extortions, and murders. But the pitcher went to the well once too often. A relative of one of his victims saw a newspaper report of a subsequent murder and the game was up. Smith, who was so callous to his confiding victims, displayed abject terror after his sentence, and had to be carried to the drop. To the practitioner the ease with which the murderer succeeded in imposing his story of epilepsy and death owing to a fit, upon three different medical men and upon three coroners, should be a warning against too facile an acceptance of a suggested cause of death, when there is really no good evidence to support such a hypothesis.

Of the small number of Leech's sketches which have to do with medical men one shows the interior of a brougham in which a country doctor is changing into hunting kit on his way to a meet. There are, no doubt, still many country doctors, and town doctors too, who hunt, and to them we may commend the new edition of *Records of the Chase*[10] by "Cecil"; we may commend it also to that most respectable

[8] *Bibliography of Hookworm Disease.* Publication No. II. New York City: The Rockefeller Foundation International Health Board. 1922. (Demy 8vo, pp. xxvi+417.)

[9] *Trial of George Joseph Smith.* Edited by Eric R. Watson, LL.B. Edinburgh and London: William Hodge and Co., Ltd. 1922. (Demy 8vo, pp. viii + 329; 12 illustrations. 10s. 6d. net.)

[10] *Records of the Chase.* By Cecil. Third edition. London: P. Allan and Co. 1922. (Demy 8vo, pp. xi+29; illustrated. 12s. 6d. net.)

person, as Cecil would have said, the desultory reader, if he knows how to skip, an art the editor of this third edition has wisely practised in eliminating most of the detail about particular hunts the original author introduced into his second edition. The book was first published in 1854, and in the slightly pompous diction sporting writers affected gives a picture of the countryside in that day of great nobles and great commoners, men of broad acres, who did things in the grand style; incidentally it describes some "originals" both among them and their poorer fellow sportsmen who followed the hounds on foot.

The edition of the *Medical Directory* for 1923[11] has been published. It has not been allowed to increase in bulk; in fact, it contains fewer pages than the issue for 1922, but it does not appear to be in any respect less complete. We doubt, indeed, whether any profession is supplied with so comprehensive a directory to its members and to its principal institutions. The number of names in the volume has grown from 45,586 last year to 46,311 this year—an increase of 725. In the two previous years the increases were 660 and 666 respectively, but in the issue for 1920 there were 1,160 names more than in that for 1919. The numbers recorded are larger in each of the parts into which the *Directory* is divided, except under "Services," where the number has declined from 3,475 to 3,458; this is still rather larger than in 1913. Of the total increase of 725 names England, outside London, accounts for 260. In conclusion, we can only once more commend the publication to the profession as a most reliable work of reference.

In the preface to the fourth edition of his work on tropical diseases[12] Surgeon General STITT states that he has adhered to the original plan of the manual, as he believes the arrangement gives the student or tropical practitioner a concise and readily accessible presentation of the subject. He accepts the spirochaetal etiology of yellow fever, and has transferred the chapter on this disease to the section on protozoal diseases. But we may ask why the transfer is to this section. The leading protozoologists of the day do not accept the spirochaetes as protozoa, but regard them as more akin to the bacteria group. Six new chapters have been added in this edition. They deal with epidemic jaundice, rat-bite fever, tularaemia, tables of helminthic and arthropodan diseases, trench fever, and a chapter on the diagnostics of tropical joint, muscle, and bone lesions. Accounts of the treatment of ankylostomiasis by carbon tetrachloride and of methods of administering arsphenamine and antimony have been introduced. It was certainly very necessary to make these additions, which bring the book up to date. Many new illustrations have been added. Every effort has rightly been made to retain the feature of a pocket manual, but even so it has been necessary to increase the number of pages from 524 to 610 and the illustrations from 119 to 159. This deservedly popular little work should, in its new guise, retain its high place amongst works on tropical medicine.

[11] London: J. and A. Churchill. Seventy-ninth annual issue. 1923. (36s. net.)

[12] *The Diagnostics and Treatment of Tropical Diseases.* By E. R. Stitt, Ph.G., M.D., Sc.D., LL.D., etc. Fourth edition, revised. London: Lewis and Co., Ltd. 1922. (Post 8vo, pp. xiii + 622; 159 figures. 18s. net.)

MEDICINAL AND DIETETIC PREPARATIONS.

Hemostyl.

HEMOSTYL is the trade name given to a preparation of sterilized horse serum, obtained from horses in a state of active blood regeneration, induced by repeated bleedings. The claims made for it are based on the results of Professor Carnot of Paris, who maintained (1906) that such serum was of particular value in anaemia. Preparations are made for oral, rectal, or hypodermic administration. Horse serum from horses in a state of active blood regeneration is stated to be of value in anaemia by reputable investigators, but their claims cannot be considered as having obtained general acceptance. It is, of course, difficult to frame any theory to account for such an action, and it is surprising that horse serum, given by the mouth, should have any general action, particularly in persons living on a diet containing meat. It is scarcely necessary to remark that the estimation of the value of any agent as a cure for anaemia is a matter of very great difficulty whether in clinical practice or by laboratory experiments. The agents for hemostyl in this country are Bengué and Co., 52, Charlotte Street, Oxford Street, W.1.

Idozan.

Idozan is stated to be a neutral preparation, containing 5 per cent. of iron in a non-irritant form, which is readily dissociated to liberate ionized iron. Our examination showed that idozan had a sweetish taste and did not produce any astringent effect in the mouth, even when tasted undiluted. It was found to contain 5 per cent. of iron in a non-ionized form, and ultra-filtration tests showed that at least 97 per cent. of the iron was present in colloidal form. Free iron is slowly released on warming with dilute acids, and therefore the iron should leave the stomach in a form in which it can be assimilated. Idozan is therefore a concentrated non-irritant preparation of iron very suitable for therapeutic administration, particularly when it is desired to give large doses of iron. In the literature supplied interesting quotations are given from Professor Poulsen and Dr. Lichtenstein, urging the importance of intensive iron administration in cases of anaemia. The purveyors are Messrs. Chas. Zimmermann and Co., 9 and 10, St. Mary-at-Hill, London, E.C.3.

Opoidine.

An interesting new preparation of opium, called opoidine, has been placed on the market by Messrs. Macfarlan and Co. (11, Moor Lane, Fore Street, London, E.C.2). It is a preparation of the total alkaloids of opium in soluble form; one part of opoidine is equivalent to five parts of opium. Opoidine contains about 50 per cent. of morphine, the remaining 50 per cent. consisting of the other opium alkaloids—narcotine, codeine, etc. Straub and others have drawn attention to the remarkable action of narcotine in "potentiating" morphine. The minimal lethal dose for mice of morphine is 0.6 mg. per gram of body weight, and of narcotine more than 0.5 mg. per gram; but a mixture of morphine and narcotine may be fatal in a dose of 0.2 mg. per gram. In the case of opoidine, for example, the minimal lethal dose for the mouse is 0.3 mg. of total alkaloids per gram (hypodermic). The exact differences between the mode of action of morphine and of the total alkaloids of opium are not fully understood, but there is considerable evidence that the latter are of particular value when it is desired to act upon the gut or upon plain muscle. Certain preparations of the total alkaloids of opium of Continental origin are upon the market and have proved of value, and we welcome the enterprise of Messrs. Macfarlan in providing a British preparation of this nature.

ROYAL MEDICAL BENEVOLENT FUND.

AT the meeting of the Committee held at 11, Chandos Street, W., on October 10th, 1922, 51 cases were considered and £627 1s. voted to 39 applicants. The following is a summary of some of the cases relieved:

Daughter, aged 20, of M.B.Durh., a staff surgeon in the Royal Navy who died in 1905. Applicant has a naval pension of £14 a year until she is 21, and a scholarship of £12 from the Royal Naval College. She asked the Fund to help her with fees for King's College. Her brother-in-law has promised her £1 a week towards expenses. Voted £10.

Daughter, aged 49, of M.D Aberd. who died in 1915. Owing to ill health she is unable to work, and has been living upon her capital, which is now reduced to £200. Her relations are able to give very little—last year £20. Voted £26 in twelve instalments.

Widow, aged 52, of L.R.C.P. and S. who practised as a ship's surgeon. Help asked towards the education of her two daughters. School fees owing amount to £14 11s. Voted £26 in six instalments.

Widow, aged 57, of M.R.C.S. and L.R.C.P. who died recently. When the estate is settled it is expected that income will only amount to £65 per annum; she asked for assistance towards the school expenses of her son, aged 14. Voted £18 in twelve instalments.

M.B., Ch.B.Aberd., aged 37, with pulmonary tuberculosis and unable to work. He has been in a sanatorium fourteen months. Disability pension £10 a month, and after deducting 12s. a week he is able to pay his wife £7 10s. a month for herself and daughter, aged 4. Sanatorium allowance £6 6s. and Lady Dudley's Fund, £1 11s. 6d. This allowance pays fees at sanatorium except laundry and surgical dressings. Voted £20.

Subscriptions may be sent to the Honorary Treasurer, Sir Charters Symonds, K.B.E., C.B., F.R.C.S., at 11, Chandos Street, Cavendish Square, London, W.1.

The Royal Medical Benevolent Fund Guild is overwhelmed, in these days of exorbitant prices for clothing and household necessaries, with applications for coats and skirts for ladies and girls holding secretarial posts, and suits for working boys. The Guild appeals for secondhand clothes and household articles for the benefit of the widows and children who in happier times would not have needed assistance. The gifts should be sent to the Secretary of the Guild, 43, Bolsover Street, W.1.

AN institute for the study of the influence of mountain climates on tuberculosis has been opened at Davos, under the direction of Professor Adolf Loewy of Berlin.

IN Japan suicides caused by persons taking rat poison are rapidly increasing; in 1921, according to the *Japan Medical World*, there were 1,017 cases. During 1920 there were 640 deaths from this cause, and in 1919 there were 95. The attention of the Japanese Home Department was first called to this painful mode of suicide in 1914, when 6 deaths from it were reported.

Nova et Vetera.

MASTER JOHN ARDERNE.

FOR the general reader the imposing figure of Guy de Chauliac dominates mediaeval surgery. The reader has also perhaps heard the names of Henry of Mondeville and of the Fleming Jehan, while Haeser's notice of John Arderne excites without satisfying curiosity. Mr. H. S. Wellcome has increased the already heavy debt of gratitude owed him by historical students by causing to be published a translation of the old Newark practitioner's *de Arte Phisicali et de Cirurgia*.* The editor and translator is Sir D'Arcy Power, which is a concise way of saying that text, notes, and introduction leave nothing to be desired. The translation is of an illuminated manuscript, from an early fifteenth century hand, preserved in the Royal Library of Stockholm. The editor says that it "omits much, adds something, and takes out entirely the personal element and quaint touches which make the original manuscripts such excellent reading. It is in fact Arderne, spoilt by his editor—a catastrophe which still happens to some medical writers of repute." Sir D'Arcy Power is much too modest in the appraisement of his literary wares; indeed any one of the thirteen beautiful plates with which the volume is embellished establishes a better claim to be called picturesque than most historical monographs.

Master John Arderne was born in 1307 and lived to the end of the fourteenth century. He was probably (says Haeser) educated at Montpellier and certainly in the service of Henry Plantagenet, first Duke of Lancaster. The Duke died of plague in 1361 and Arderne perhaps then attached himself to John of Gaunt. He practised at Newark from 1349 to 1370 and then in London. He was essentially, says his present editor, an operating surgeon in good practice, a man of good education meeting his clients on terms of equality.

Sir D'Arcy Power propounds the fascinating hypothesis that the Stockholm manuscript may have been sent to John of Gaunt's granddaughter, Queen Philippa of united Norway and Sweden, by "some one who had known and loved the wise old surgeon who had been so long in the service of her grandfather."

JOHN ARDERNE.

John Arderne was a bold, practical surgeon; he had sufficient originality "to invent the operation for the cure of fistula which, after falling into disuse for nearly five hundred years, is now universally employed." The writer of the Stockholm manuscript has not, we submit, altogether dissipated the aroma of the original case notes in the following account.

"I cured a man from Northampton of the aforesaid Fistula in ano who had three openings in the left buttock and three in the cleft of the scrotum as is here depicted, and all in turn communicated the one with the other and had perforated through the middle of the scrotum. I cured him by incision of all the holes, both in the rectum and elsewhere. Blood welled out strongly from the incision in the rectum because the fistula was very deep. I, therefore, dipped a sponge in cold water and swabbed up the blood; afterwards I put on the wound a blood styptic of powdered madder, and a good sponge having been placed under the patient he was made to sit in a chair and immediately the bleeding ceased. When he had taken food the invalid was put to bed and slept well all that night without any bleeding forsooth, and in the morning he said he was 'fine.' Afterwards, however, viz., on the second day after the operation, I filled all the wound with powder 'sine pare' and with oil and eggs and sal. populi and with diaflosm, and in less than twelve weeks I cured him completely. And he said, indeed, that twenty doctors had treated him and he had been operated upon by ten. Nevertheless he rode on horse-back about the fortieth day after I made the incision."

The name of the "man from Northampton" has come down to us in another manuscript. He was one John le Colier, mayor of the town in 1326–27, and again 1339–40. We should think it was thanks to John Arderne's skill rather than to the twenty doctors he was able to be so regular an attendant at the Town Council that his name appears as a witness to thirty-three documents between 1315 and 1340.

John Arderne tackled a sequestrum in the leg of a nobleman in this way:

"I first removed the flesh down to the bone with an ointment of roses, and I scraped it every day. And one day when I was scraping the bare bone with an instrument it moved upwards and downwards. I watched this remarkable node: but for the rest I gave up any further operation and put nothing over the wound except licium mingled with new honey and the yolk of a raw egg applied on carded linen stupes, and I did this from day to day until the aforesaid bone, with the flesh receding from it, appeared at the end of the wound and became more and more moveable. And when I saw this I put the point of a scalpel under the edge of the bone: and raised it little by little. But that piece of bone was four thumbs in length and two thumbs in breadth, and in thickness it extended nearly to the marrow of the bone, and it was the front of the tibial bone, i.e., Schynbone. After the separation of the bone I finally closed the wound with a licium dressing of honey, etc., and the yolk of raw eggs."

His medical treatment was less spirited and dealt largely in "nasty or innocuous substances." "Against epilepsy," says John, "write these three names with blood taken from the auricular finger of the patient—Jasper, Melchior, Balthazar, and put gold, frankincense and myrrh into a box. Let the patient say three paternosters and 3 Ave marias daily for the souls of the fathers and mothers of these three kings for a month and let the patient drink for a month of the juice of peony with beer or wine." We may not agree that "without doubt this remedy never fails," but it is quite as effective as and much less nasty than draughts of the warm blood of gladiators which have classical authority.† We may laugh at the three kings from the East; we shall not laugh at another prescription, the recital of which shall conclude our brief notice of the wise old surgeon. "A good prayer to be said. O God, Who hath wonderfully created mankind and hast more wonderfully reformed him, Who hath given medicines to govern the health of men's bodies, of Thy great goodness look down from Heaven and give Thy blessing to this antidote: *or* electuary, *or* potion, that the bodies of those whom it shall enter may be worthy to receive health of mind and body through Christ our Lord. Amen."

* *De Arte Phisicali et de Cirurgia*, of Master John Arderne, Surgeon of Newark. Dated 1412. Translated by Sir D'Arcy Power, K.B.E., M.B. Oxon., F.R.C.S., from a transcript made by Eric Millar, M.A.Oxon. London: John Bale, Sons, and Danielsson, Ltd. 1922. (Double cr. 8vo, pp. 60; with coloured frontispiece and 13 plates.)

† "Quidam jugulati gladiatoris calido sanguine epoto tali morbo se liberarunt: apud quos miserum auxilium tolerabile miserius malum fecit" (Celsus. *de Med.*, III, 23).

ANTHRAX PROTECTION.

THE GOVERNMENT WOOL DISINFECTING STATION.

IN our issue of December 3rd, 1921, on page 952, we described the station for the disinfection of wool and hair at Liverpool, and reproduced two photographs of it. We have now received a further memorandum from the director, Mr. G. Elmhirst Duckering, on the work done at the station. From this it appears that the institution has emerged from the experimental stage and is now an interesting example of the successful application of scientific investigations to an industrial and public health end.

"The disinfection process is arranged in seven stages, the machinery for opening the bales of raw material, feeding the material into the machines, disinfection, drying, cooling, and re-baling being designed to permit of the carrying out of all seven stages in sequence as one operation, without direct handling of the material by the workmen. They are as follows:

"*Stage 1.*—Hydraulically pressed bales as imported are placed on the moving platform of a feeding and opening machine and the steel bands and canvas covers removed. The material itself is not touched, but travels on the platform into the machine, where it is opened and delivered into the first process machine.

"*Stage 2.*—In the first process machine it is submitted for ten minutes to the action of a dilute alkaline solution at 102° F. in order to remove the albuminous matters by which the anthrax spores are protected. It is then squeezed through rollers and delivered into the second process machine.

"*Stage 3.*—The material is here acted on for twenty minutes by a dilute alkaline soap solution at 102° F. in two successive baths, the purpose being to promote a condition of the spores in which they can be killed with comparative ease. This stage is essential to the process, and it possesses the advantage that it also cleanses the material completely. It then passes through rollers into No. 4 process machine.

"*Stage 4.*—In this stage the actual disinfection is carried out, the material passing through two successive baths (with rollers between) of a 2.3 per cent. solution of formaldehyde at a temperature of 106° F. It then passes through rollers and is blown by air into a drying machine (Stage 5), from which it is discharged into a cooling machine (Stage 6), and from there blown by air into the charging box of a baling machine and baled into hard pressed bales of about 320 lb. (Stage 7)."

The two machines containing formaldehyde solution are completely enclosed; they have to be entered at times—for example, for rewrapping the rollers. The workers then wear army box respirators filled with charcoal. That no ill effects have occurred among the workers in the disinfection station is a proof of the efficacy of the measures taken to isolate the anthrax contamination and formaldehyde vapour from them.

"The conditions which must be rigidly controlled in order to secure disinfection are: (*a*) strength of solutions; (*b*) temperature of solutions; (*c*) time of exposure to solutions; (*d*) temperature of drying. This control can only be secured by constant tests, hourly thermometer readings, and chemical analyses, etc."

To check the efficiency of the disinfection samples of raw material and of material after disinfection are taken morning and afternoon and examined, in part by Dr. W. Campbell for the Bradford City Council as an independent authority, the remainder by Dr. F. W. Eurich, formerly bacteriologist to the now dissolved Bradford Anthrax Investigation Board.

This bacteriological examination is regarded as a direct control of the efficiency of the process; cultivation of colonies of bacteria other than anthrax does not necessarily indicate inefficient disinfection, but in general the culture of more than five colonies of other organisms is regarded as pointing to inefficiencies, and if these are not indicated plainly on the daily reports they are specially sought for.

Table showing Results of Bacteriological Examinations from the Beginning of Disinfection to Date.

Material Disinfected—	Raw Material.			Disinfected Material.			
	Samples Examined.	Anthrax Found.	Free from Anthrax, but over 100 other Organisms found.	Samples Examined.	Anthrax Found.	No Growth.	Free from Anthrax, but over 5 other Organisms found.
Compulsorily ..	231	24	119	301	0	166	29
Voluntarily ...	75	5	33	93	1*	50	5
Totals ...	306	29	152	397	1*	216	34

* The one case where anthrax was found after disinfection was "before proper control of disinfection was established when starting station. Temperature low. Exposure too short, and strength of formaldehyde solution low."

Note.—Voluntarily disinfected raw material in which anthrax was found comprised: Persian wool 3, East Indian wool 1, Indian cowtail hair 1.

The Anthrax Prevention Order of June 1st, 1921, required all wool and animal hair coming from or through Egypt and all East Indian goat-hair to be disinfected. The imports of these materials fell off, and efforts were made to induce voluntary sending of material for disinfection; this is a growing branch of the work, as the following table shows:

Output of Disinfecting Station.

Periods.	Compulsorily Disinfected.	Voluntarily Disinfected.	Totals.
	lb.	lb.	lb.
July 4th, 1921, to March 31st, 1922 (9 months)	500,845	81,247	582,092
April 1st, 1922, to September 30th, 1922 (6 months)	584,558	123,478	708,036

Among the materials sent voluntarily were in order of bulk: East Indian wool, Persian wool, goat-hair, horse-hair manes and cowtail hair, mohair, alpaca, etc.

It was intended to make the station self-supporting, and a charge is made for disinfection. To make disinfection a commercial proposition for the trade the charge is 1½d. a pound, reckoned on the weight of the cleaned disinfected material. This is approximately the Bradford charge for ordinary washing of the material. As the cost of formaldehyde is almost three farthings a pound of disinfected material, to cover working costs an average output of 40,000 lb. a week is necessary.

Conclusions.

The memorandum we have summarized shows:

(*a*) The need for the compulsory disinfection of the materials so dealt with.

(*b*) The appreciable risk to health that was eliminated by the disinfection of the voluntary material.

(*c*) That the process is efficient, and that the workers are adequately protected from risk.

(*d*) That given a sufficient bulk of material the method, while itself self-supporting, is not expensive to the trader since he gets disinfection and cleansing of his material at the cost of cleansing.

Lastly, the report seems to indicate that the suggestion, made at the International Labour Conference of November, 1921, for universal compulsory disinfection of wool has been advanced to the stage of a practical possibility.

PROPOSED DISINFECTION OF WOOL BY A RADIOLOGICAL METHOD.

We have received a copy of another report by Mr. Duckering, on a test of a suggested method of disinfection of wool by means of ultra-violet rays. About a year ago reports were published in the press stating that two investigators had discovered a method of destroying anthrax spores in bales of wool by subjecting the bales to the action of rays described as ultra-violet rays. On inquiry it was found that the investigators proposed the use of both *x* rays and the rays from mercury-vapour lamps, and claimed that by this means the whole of the material in a warehouse could be sterilized in two minutes. The Anthrax Committee was strongly pressed to carry out experiments, as, if efficient, the method would be cheap and the bales could be sterilized in bulk without being opened.

Accordingly arrangements were made for the apparatus to be fixed up and for bales of wool containing known infected material to be submitted to the action of the rays. The test material was prepared in the same manner as in the experiments of the Departmental Committee on Anthrax—namely, by adding a large quantity of anthrax spores of known resisting power to fresh sheep's blood and preparing blood clots on wool from the blood so infected.

Two blood clots of the infected test material were placed in the centre of each of two bales, one being a press-packed bale of the usual type, the other a large hand-packed bag or "square." The test was carried out on March 15th in the presence of the two investigators and their assistants (who manipulated the apparatus), Dr. Arthur Eastwood, Dr. Eurich, and the members of the Departmental Committee. After the experiment the bales were taken to the Government wool disinfecting station, the infected blood clots removed and placed in sterile receptacles. One blood clot from each bale was handed to Dr. Eurich, and one clot from each bale was sent to Dr. Eastwood for examination.

In their reports on the infected test material after bacteriological examination both Dr. Eastwood and Dr. Eurich state that cultures from each sample yielded an abundant growth of anthrax bacilli as well as of other bacteria. Dr. Eastwood adds that the cultures produced fatal and typical anthrax in guinea-pigs in two days.

British Medical Journal.

SATURDAY, DECEMBER 9TH, 1922.

CANCER AND SPECIFIC IRRITANTS.

FOR none of the many theories relating to the causation of cancer has such concrete evidence been obtained as for the theory of irritation, expounded, if not indeed originated, by Virchow; but this evidence, striking though it be, is forthcoming only in a comparatively small number of cases of cancer, and is as conspicuously absent in the great majority. Whether future research will succeed in identifying any large number of cancer-producing agents in addition to those now implicated cannot of course be anticipated, but since Virchow's time many more specific irritants have been brought into prominence in this connexion. The Section of Pathology at the Annual Meeting of the British Medical Association was fortunate in bringing together such important contributions to the discussion on this subject. Even if irritation cancers should be found to represent only a small percentage of malignant tumours, the investigations, clinical and experimental, which are now being conducted may be expected to throw light on numerous problems in tumour pathology. Here, indeed, the clinician and the experimenter can work together. The observations of such cases occurring in man constitute experimental inquiries no less than those performed in the laboratory. Apparently the pathological processes take longer to develop in human beings than in laboratory animals, a fact which seems to permit of more detailed examination of the pre-cancerous states in man, and of the adoption of measures to combat the onset of the malignant stage; on the other hand, laboratory experiment enables the investigator to exclude many, if not all, of the adventitious circumstances that prevent a clear view of the real etiological factors.

The mere fact that so very few of the subjects exposed to the action of any particular suspected irritant do develop malignant disease, and then only after what seems an inordinate length of time, gives colour to the prevalent conception that the part played by the irritant is, even in these instances, quite secondary, and that we must still search for some single recondite cause that operates only on suitably prepared soil. According to this view the pre-cancerous alteration of tissues may result from the action of very diverse pathogenic agents, but the actual malignant tumour formation, which may or may not supervene, is an independent process, and not merely a further progressive development of the original tissue reaction. It thus comes about that, speaking broadly, two schools have arisen: the one regards cancer as a single pathological entity resulting in every case from some single identical cause, while the other considers cancer to be a broad classification of similar tissue reactions which may result from numerous different causal agents. Between these two contending schools no one can judge at present.

For a hundred years chimney-sweeps' cancer stood as the solitary example of the close association between a definite irritant and a peculiarly located disease. Within the last forty years others have been added—as, for example, tar and pitch cancer, kangri cancer, paraffin cancer, aniline cancer, and, perhaps most striking of all, *x*-ray cancer. The personal experience of any one man in most of these has been confined to the observation of very few cases, and has lacked the broad outlook over a large number that would be necessary to warrant the drawing of sure conclusions. Even more disconcerting was the fact that all attempts at experimental reproduction of cancer by any of these agents were, until quite recently, perfectly fruitless. The communications which we publish in this issue supply this deficiency: the clinical observers have had experience of a sufficiently large number of cases from which to draw conclusions, and the laboratory workers have been eminently successful in their experimental essays.

Epitheliomatous ulcerations occurring in industries dealing with tar, pitch, and paraffin are now compulsorily notifiable by order of the Home Office. The recognition of the peculiar liability of workmen in these trades to skin cancers as a result of their occupation allows not only of the recognition of the earliest signs of tumour growth, and consequently the prompt use of remedial means, but also of the institution of preventive measures against their occurrence. The general adoption of the precautions urged by Dr. Legge must do much to diminish the incidence of such occupational diseases. He points out that there are grounds for supposing that blast-furnace tar is devoid of the dangerous properties associated with ordinary gasworks tar, and we understand that this has been experimentally corroborated by Dr. Leitch. It is of interest to note that though chrome workers are liable to ulcerations from contact with chemical substances yet no case of cancer developing on these ulcerations has been reported to Dr. Legge. If it were merely a question of a predisposing cause it would be natural to expect that epithelioma would supervene just as frequently in them as it does in pitch and paraffin workers.

Dr. Alexander Scott during his twenty years of practice in a paraffin refining neighbourhood has had unique opportunities of investigating the occupation dermatoses of paraffin workers. More cases have come under his personal care than have previously been reported in the literature of the subject, and he has traced the development of the cancerous conditions to their earliest beginnings. The very long latent period before the onset of cancer in those exposed to the action of the irritating oils is a point that merits careful consideration in attempting to found causal relationships between a suspected primary agent and the pathological effect.

X-ray cancer may be considered as an instance of the experimental production of cancer in man. Mr. Rowntree, who has investigated and followed for several years practically all the cases that have occurred in this country, points out that a preliminary burn and frequently repeated small exposures to the softer rays seem to be essential to the production of epithelioma, and he is of opinion, in view of the recognized dangers and the precautions now adopted against them, that no more cases are now likely to develop.

During the last few years experimental cancer research has entered on a new phase, in that it has begun to concern itself with the direct investigation of possible causal agents. This development had its starting point in the patiently pursued and brilliant researches of Fibiger of Copenhagen, who was the first to produce indubitable cancer by experimental means. It will be fresh in the memory of all who read the full accounts published in our columns that, having found some cases of gastric cancer in a single batch of rats, he discovered in these tumours a hitherto unknown species of nematode, the *Spiroptera neoplastica*, and set himself to trace the origin of this worm, which passed its larval stage in the muscles of imported cockroaches; he succeeded in cultivating the parasite, and by transmitting it to other rats produced gastric carcinomata in them. Inspired by the success of his work, Yamagiwa and Ichikawa resumed again the attempts to induce cancer of the skin by long repeated applications of tar to rabbits. Their experiments, performed during the late war, might not have

gained general credence, even when they were more convincingly demonstrated on mice by Tsutsui, had they not been verified and extended by Fibiger and Bang, who were the first European investigators to realize their great value. In this country the observations have been continued by Murray and Woglom, Leitch, Cruickshank, Russell, and others, and many important facts have been elicited. The variations in individual susceptibility, the different rates of tumour development, the relation of tumour reaction to the duration of the irritant rather than to the age of the animal, the histological examination of the precursory conditions, and the endeavours to discover the particular noxious substance contained in the complex mixture of coal-tar, are some of the points that have been, and are being, dealt with. Dr. Murray finds in the ether-soluble fractions of tar a very potent tumour-producing agent, and Dr. Passey has succeeded in isolating from soot what are probably very similar substances—a research which throws some light on the etiology of chimney-sweeps' cancer.

Dr. Leitch, using experimental methods to supplement or explain clinical observations, shows that even though the operation of the causal agent be removed when only simple papillomata have been produced, yet the reaction of the tissues continues in many cases to the full development of carcinoma; indeed, he finds that if the irritant has been in action for a sufficient length of time and is arrested before any neoplastic change whatever is discoverable, epithelioma not infrequently declares itself at a later date. This convincing experimental demonstration appears to indicate that cancer is the result of cell damage done a long time before the response by new formation is in evidence. The same observer has also succeeded in inducing carcinoma by means of the paraffins of shale oils, and, strangely enough, he has been able to produce sarcoma by the same substances—a thing which has not yet been reported amongst the cases of paraffin cancer in man. Finally, he and Dr. Kennaway have produced cancer in mice by external applications of arsenic.

Thus cancer has now been produced by various agents—by the *Spiroptera neoplastica* (Fibiger), by tar (Yamagiwa and Ichikawa), by the *Cysticercus fasciolaris* (Curtis and Bullock), by paraffin oils (Leitch), by arsenic (Leitch and Kennaway), and by soot extract (Passey). Probably the number of substances that are capable of producing cancer will be largely increased in the near future, and the theory of irritation will in consequence become more impressive.

THE ASSOCIATION IN 1922.

THE year 1922 has been a fortunate one for the British Medical Association; its membership has increased, its political work for the profession has been carried on with success, and it had in Glasgow an ideal place for its Annual Meeting. That great city is not only a centre of huge industrial population for the benefit of which important hospitals exist, but it possesses also an ancient university whose renown has been in no way diminished, but, on the contrary, much increased, by the great staff of teachers which it now possesses. For its President the Association had one of the greatest of these teachers—Sir William Macewen, Regius Professor of Surgery in the university, whose renown as a clinical and scientific surgeon is world-wide. He had the cordial co-operation of his colleagues in making the Annual Meeting the scientific and social success it was. Reports of the work of the scientific Sections have been published in our columns during the past four months, and are now nearly complete. On many occasions during 1922 we have had opportunities of bringing to notice the clinical and scientific work accomplished by members of the Association in the Divisions and Branches, and have published a number of lectures given for the Association by many distinguished clinical and scientific workers—lectures which in themselves are important contributions to post-graduate study.

It would be impossible to attempt even to mention all the political and social work the Association has done during the year, but we may point to a few of the more outstanding events, turning first to its hospital policy, which has undergone great developments. Recent years have brought new problems in hospital administration. There has been a steady growth and elaboration of modern methods of treatment, and the expenditure thereon has necessarily become greater. That the popularity of the voluntary hospitals has grown is shown by the ever-increasing demands upon their resources. These conditions, together with the sudden alteration in money values following the war, brought the voluntary hospitals face to face with bankruptcy if newer methods of support could not be found. Temporary help was given by the Government upon lines that had been advocated by the Association—that is to say, through an independent intermediary body. Further support came from the patients themselves; for it was evident that the higher level of economic condition attained by the bulk of the patients now seen at hospital removed very many of them from the category of the indigent, for whom alone the free treatment of a charity could properly be provided. Payments by patients during treatment, and the expectation that there would be developments in contributory schemes through which fit and proper persons could provide against the possible necessity for hospital benefit during serious sickness, made much of the existing policy of the Association as regards hospitals out of date and valueless as a standard of medical policy.

The Council of the Association therefore undertook, through its Hospitals Committee, the preparation of a complete report on hospital policy. This was submitted to the Annual Representative Meeting at Glasgow in July, 1922. A document of such magnitude, dealing with so variable a problem as hospital practice, might well have been expected to provoke much criticism and possibly lively opposition. Thanks to the methods the Council had followed in the preparation of the report, especially the summoning of conferences of hospital staffs, the report was accepted with remarkably little emendation. The only point on which serious opposition developed was on the recommendation for assessment for the purposes of a staff fund of the smaller payments made by individual patients. On this there is now before the Divisions a recommendation from the Council, which it is believed will prove acceptable to all parties as a suitable line of policy in this regard.

The whole scheme of hospital policy, as approved by the Annual Representative Meeting, was published so recently in the JOURNAL (SUPPLEMENT, October 7th, 1922) that extended reference to it is scarcely necessary. The main provisions include, first, the recognition of a dual policy for voluntary hospitals in the continuance of the charitable side of the hospitals for indigent patients, who should receive maintenance and treatment free; and in making provision for others who cannot secure or pay for adequate treatment elsewhere, but from whom payment should be received by the hospital, and on account of whose treatment some method of remuneration of the honorary medical staff should be arranged. Secondly, the requirement that services rendered by the hospitals to the State (either central or local departments) should not fall upon the funds of the charity, but be met by the State or local authority, both as regards the costs to the hospital and the services of the medical staffs. Thirdly, the recognition of the principle of contributory schemes for hospital benefit, and the indication of standards by

which such schemes could be tested—for example, the protection of the hospital from insurance risks which properly fall upon the scheme or the contributors thereto; the preservation to the hospital of the right of determining the suitability of a patient for admission; the need for improvement of out-patient departments with the object of making them primarily places for consultation, and in this connexion securing that members of contributory schemes should not be collected into these departments but receive consultations and specialist treatment outside through independent practitioners. Already these standards are proving of value to medical staffs in enabling them to check the details of contributory schemes now being promoted—for example, that of the Hospital Saving Association for London.

The policy of the Association has been further developed with regard to Poor Law infirmaries and municipal hospitals. The Association desires that these should be no longer isolated institutions but brought into the main stream of medical practice; and to this end it aims to secure that private practitioners shall have opportunity for entry into these hospitals, so that they may treat therein their own patients who so desire. Further, the relations of the several forms of hospital provision—voluntary, Poor Law, and municipal—are under review, and it is probable that the Council will make recommendations for the unification or correlation of hospital policy throughout the country, with a view to preventing overlapping of provision and wasteful competition.

Two other issues of major importance were dealt with by the Representative Body at Glasgow; they were the conditions under which it is proposed to extend the support of the Association to members acting in vindication of the accepted principles of professional secrecy, and the expression of a considered verdict upon the merits of the experiment in the provision of medical benefit under the Insurance Acts. Both are matters of vital interest, not to the profession alone but to the community, and the fact that the machinery of the British Medical Association provides the only available method of concentrating the collective experience of the profession upon the solution of these and kindred problems of public policy is in itself most striking evidence of the place taken by the Association in national as well as in professional life.

In the field of public health the minimum salaries adopted as a temporary basis of remuneration during the latter part of the war have been successfully maintained in almost every area, and it has been possible to secure more suitable remuneration in certain important cases, notably that of the medical officer of health for Manchester. This, it is true, is but the beginning of the work for the public health services that lies before the Association, but it affords a sound basis. Several conferences have taken place between representatives of the Association and of the Society of Medical Officers of Health, and it is hoped to present an agreed programme in respect of public health salaries and conditions of service for the consideration of the Council at an early date. Meanwhile the general policy of the Association with regard to the development of municipal health services has been under review.

The past year has not been marked by legislative activity. As an earnest of the future it is worthy of note that the replies of members of the present Parliament to a series of questions submitted by the Association, based on the accepted policy of the Association, show a very considerable body of parliamentary opinion in support of the constructive measures of reform included in the Association programme.

Overseas, as at home, the year has brought developments of no small significance to the profession. In Australia final effect has been given to the provisions for autonomy within the Association, and, whilst the future of professional organization in South Africa is for the moment in suspense, it is clear that the decision of the South African Branches of the Association will be a determining factor in the solution of the present difficulties. It is satisfactory to recall that by common consent the Association has succeeded in providing means for the unfettered exercise of self-determination. In the Colonial Medical Services the problem of the moment is not to secure local freedom of action, but rather to exercise a stronger protective influence centrally. No Association and no Government can secure for the Colonial Services immunity from the devastating economic consequences of the war, but certain abuses call for remedy, in the interests not only of equity but of a sound economy. This is the case more particularly with the West Indian Medical Services, and whilst the year has necessarily been a period of waiting it is at least satisfactory that with the receipt in London of the local comments upon the Wood report, the Dominions Committee will at last be in a position to make a definite and final claim for reform in the interests both of the medical officers and of the public health.

At the beginning of the year the chief outstanding professional difficulty connected with medical benefit under the Insurance Acts was that arising from the Regulations concerned with the transfer of insured persons on the death or retirement of a practitioner. The great majority of insurance practitioners have held that these arrangements were inequitable to the doctors and were disadvantageous to insured persons, and they would, when fully operative, involve the distribution of insured persons who had been the patients of one doctor among other doctors at the will of a composite, but largely lay, committee. Such a procedure may be unavoidable with regard to a small number of persons in exceptional circumstances, but to establish it as a routine whenever a practice changes hands would seem to be highly objectionable. This difficult controversy has at last been settled. The Insurance Acts Committee has secured that, where the Panel Committee take the necessary steps, the credits which would have been due to the retiring or deceased practitioner shall be continued to his successor, and that not till eighteen months later will those insured persons concerned who have not then chosen any doctor be assigned to practitioners. It may now be said that all the important matters of the regulation of insurance practice have been settled, and that there remain only those minor adjustments which must be required where any attempt is made to control in any degree the relationship between fourteen thousand doctors and fourteen million patients, actual or potential.

Two other insurance matters, however, of great importance to the whole profession have emerged in the course of the year. They have reference not to the present conduct of the service, but to its development and extension. One is the question of the exercise of any control over medical benefit by the approved societies; the other is the provision and administration of specialist services for insured persons under the aegis of approved societies. With regard to the former it must be said at once that it is impossible for the profession to recognize such control in any form. It is believed, however, that this claim is not, in fact, advanced by the great bulk of responsible members and officers of societies, though it has undoubtedly been made by a few of the less thoughtful and restrained of their officials. The societies are, of course, interested in the proper working of the insurance service, and therefore, like others, have the right to be heard by the Government department concerned: but the terms

of the contract under which the profession agrees to give its services to the State must be arranged without the intervention of any third party. The Insurance Acts Committee is calling a conference early in 1923 to which representatives of all classes of approved societies, of Insurance Committees and their clerks, and of the pharmacists are being invited, and it is hoped that at this conference it will become evident that while all those represented sincerely desire to contribute to the efficiency of the service and its harmonious working, there is no wish on the part of any section to usurp functions which do not properly belong to it.

A beginning in the provision for the services of specialists for insured persons has been made during the year in two directions. If when a regional medical officer is consulted he wishes to have further help of a special kind this is to be available at the provision of the Ministry of Health. It is believed that this arrangement has not as yet matured, but it is obviously of great importance that the profession should watch carefully the method by which and the terms on which the services of such consultants are obtained. The funds of a number of approved societies, after valuation, have enabled them to provide certain "additional benefits"—such as ophthalmic benefit—for their members, and these remain under the administration of the societies so long as they take the form of a contribution to the cost of obtaining the particular service in question and not the direct provision of that service. It is unsatisfactory that additional services, whether those of nurses, dentists, or surgeons, should be available for a portion only of the insured population, and should be administered piecemeal by societies and not by public bodies. Serious difficulties are already arising, and here too the profession must watch carefully the narrow line which divides "contribution to cost" from "provision of treatment"; and those members of the profession who are approached to give such treatment should assure themselves as to the propriety of acceptance. The profession, no less sincerely than the societies, desires to extend the range of the medical benefit secured to insured persons, but the conditions under which this is brought about are of vital consequence, and every one, whatever his class of practice, should be prepared for united action.

INDIRECT ADVERTISEMENT.

BEFORE the General Medical Council brought its winter session to an end an interesting discussion took place on what has, for convenience, been called indirect advertising. The subject was raised by Dr. Bolam, who spoke from a sheaf of cuttings from lay newspapers collected during the last few months. Dr. Bolam's lucid and well documented statement convinced the Council, which unanimously resolved to instruct its Executive Committee to report on the expediency of amending its Warning Notice (No. 5) issued seventeen years ago.

The discussion is reported in the SUPPLEMENT, and it will be seen that Dr. Bolam, in his review of the situation, dealt with things old and new. Among the latter he instanced the insertion of announcement in the column of "Fashionable Intelligence," which in many newspapers follows the Court Circular. Sandwiched between announcements that a financial magnate has sailed for Mexico, and that a duchess has taken a new house in London where her new telephone number will be Westend 6000, we learn that Dr. C. has returned to 210, X Street, and that his telephone number is unaltered (Westend 4000). The announcement may be less crudely phrased, but, however ingeniously worded, it is an advertisement and is paid for—usually at a special rate. This sort of thing is not new, but we seem to be suffering from a recrudescence just now. Then there is the habit of writing letters to the lay press on some disease or epidemic in which the public happens to be interested at the moment. This also is not new, and such letters may be quite useful, but they come under suspicion when the writer appends to his name a string of diplomas and his address. There is more novelty in the publication of interviews and the like, sometimes illustrated by a portrait of the interviewee, and in the appearance in a series of lay journals of articles by the same hand on some specific medical subject about which the writer implies or asserts that he has had an extensive experience. These things are no doubt to be associated with the curious revival of "personal journalism" we are witnessing. In this the newspapers of to-day are coming to resemble those of a century ago, with this difference—that the personal articles then were often scathing criticisms, whereas now they are usually laudatory and only injure the person mentioned when the butter is clumsily spread or is laid on too thick. The discovery by the reporter of the Harley Street specialist dates back some ten or twelve years at least, and the average reader was at first mildly curious to know how it happened that the eminent one always lived in Tennyson's "long unlovely street" and never in the square at the bottom, or in one of the adjacent thoroughfares. After a time the more intelligent or the more cynical began to say with Mrs. Betsy Prig, "I don't believe there's no sich a person," or to suspect that he had been gathered to his fathers, leaving behind him a textbook convenient for reference; this theory seemed to find support in the somewhat antique character of some of the oracles. But the reporters had a ready retort, declaring, in the words of Mrs. Gamp, that such a doubter was a "bage creetur," and that it was simpler to use the telephone than to search a medical work of reference containing many terms with which they were unfamiliar. There was a simplicity, as of Brother Juniper, about all parties which rendered the plan almost innocuous, and the average man might even find that the thunders of his morning paper gave to the dishes he consumed at dinner the added zest of the forbidden.

But after a time His Eminence of Harley Street began to pall on the public; like Launcelot Gobbo's father, he "did something smack, something grow to—he had a kind of taste," and the reporter, being a man of resource, set out to search for a substitute; he found it quite easily in the interview. He may have remembered how Mrs. Gamp, who was a famous practitioner, though she did not live in Harley Street, when she repelled Mrs. Prig's bragian words, appealed to Mrs. Harris's "own sweet picter hanging up afore you all the time." So we may suppose arose the illustrated interview.

There is no reason why the editor of a lay paper should not get good articles written for him by authorities who really know what they are writing about. It is one of the advantages of anonymous journalism, upon which the press has flourished in this country and indeed in most countries (the signatures in French newspapers, except in the case of politicians, are mostly pseudonyms), that the anonymity makes the editor and his assistants more fully conscious of their responsibility towards their readers.

The task before the Council is not quite easy, and it is annoying that the tactless self-seeking of a few should have compelled it to be undertaken. The Council will be anxious to do nothing to hamper the discharge of the obligation under which the profession lies to inform the public of the progress of knowledge with regard to the prevention of disease and the preservation of health. Dr. Bolam touched on this aspect of the matter when he said that it was a man's right and duty (and

a woman's also) to take part in public work; he went on to point out that the degree of publicity necessarily attending such work need not, and with the high-minded did not, lead to the advertisement of the individual in his professional capacity.

THE FIRST FOULERTON PROFESSOR.

IT may be remembered that last July the Council of the Royal Society announced that it had created a Foulerton Research Professorship, and that the duty of the professor would be to conduct such original researches in medicine or the contributory sciences as were calculated to promote the discovery of the causes of disease and the relief of human suffering. At the anniversary meeting of the Royal Society on November 30th the President, Sir Charles Sherrington, announced that Dr. E. H. Starling had been appointed the first Foulerton professor. The election, the President said, was "of happy augury for the success of the professorship. The fine work he has done is well known, not only to us of this Society, but to physiology and medicine throughout the world. As first Foulerton professor he is the distinguished forerunner of what we may hope will be a long line of distinguished successors in the Foulerton chair." In administering the emoluments the Royal Society would take advantage of the facilities of existing research institutions and endow selected workers wherever in those institutions they might happen to be, presupposing always the existence there of due facilities for their researches. The Society's research emoluments, therefore, did not compete with or tend to deplete existing research institutions, but to co-operate with and reinforce them. They did not withdraw the researcher from the university or other research institute to which he already belonged. "This dovetailing," the President continued, "with existing research appears especially important in its regard to the universities, because it affords help needed by the universities for the execution of research; and it seems a happy feature of the scheme that it assists research where that can be prosecuted in contact, so to say, with students, thus tending to promote research schools." Professor Starling will, we understand, continue to work at the Physiological Institute, University College, but by an arrangement between the College and the Foulerton Committee he will, after next summer, be relieved of administrative work and of the duty of teaching undergraduates, so as to give all his time to research and the training of men in research. The new laboratories at University College, with the extension to the physiological department, will be completed at the end of next term. May we humbly add our congratulations to the Royal Society on its choice. Professor Starling is one of the small band of men who have placed British physiology in the commanding position it holds throughout the world. Intellectually he is in the direct succession to the founder of British physiology, Sharpey, who in his teaching never failed to impress on his students that physiology is one of the institutes of medicine, and that though its fascination as a science might seem sufficient to justify its pursuit, it must ever have regard to the great part it can take in the advancement of medicine and in the promotion of the welfare of mankind. To few men can it have been given better to justify the position of physiology in this respect than to Starling; to him, for example, and his colleague Bayliss we owe the conception of hormones, which has had so profound an influence on medical thought and medical practice, an influence as yet by no means exhausted. We look on Professor Starling's work with that kind of gratitude which has been defined as the expectation of favours to come.

SUBCUTANEOUS VACCINATION.

THE possibility of adopting, as an alternative to vaccination by scarification or incision, the subcutaneous injection of lymph by a hollow needle has received attention from time to time in recent years. In 1908 it was reported on in Germany,[1] to the general effect that immunity follows a sufficient injection both in man and animals, but that unless a considerable reaction is produced immunity is uncertain. In India,[2] owing to a native practice of wiping off vaccine lymph from the skin, Fearnside and Poi injected hypodermically in four places. There was reaction, but no vesiculation unless the needle used had scratched the surface. In twelve cases the result was tested by application of lymph by surface scarification in the ordinary way, in every case with a negative result. The interval between the original operation and the testing is not stated. Subcutaneous vaccination on a very considerable scale has been practised by Dr. J. R. Goodall, Assistant Professor of Gynecology, McGill University, Montreal.[3] In the army he used the method for about 6,000 troops, and for a number of children of officers. The skin of the arm was sterilized with iodine, and for each case about a half to three-fourths of a tube of lymph was used, with enough sterile water to make one cubic centimetre. A fine hypodermic needle was used, and the injection was made diagonally into the subcutaneous tissue. In a few cases it was unintentionally applied intracutaneously. In about 8 per cent. of the cases there was no reaction, and in these the operation was regarded as ineffective. In the others the reaction usually began on the second to the fourth day but was occasionally delayed until the twelfth or even the fifteenth. The reaction resembled that after antityphoid inoculation—local swelling, heat, tenderness, pain, and redness. In a few cases there was swelling and oedema of the elbow, and, in a very few, of the hand and arm. After the symptoms had subsided a hard nodule was left in the subcutaneous tissue for about a month. It is claimed in effect that subcutaneous injection (1) is a clean surgical operation; (2) involves no open wound nor dressing; (3) is attended by practically no risk of secondary infection (there was no case of infection in the 6,000); (4) has a high percentage of positive results (8 per cent. negative); (5) results in a very small percentage of complete temporary incapacity; (6) is comparatively painless; and (7) causes no difficulty with children, the operation being so quickly performed. Dr. Goodall does not mention whether he in any case applied the test of subsequent vaccination in the ordinary way. Perhaps he had no facilities for doing so, and may have relied on the twelve negative tests (after an unstated interval) reported by Fearnside and Poi in India. We hear that the subcutaneous operation has been adopted under the name of inoculation to some considerable extent in London in the case of ladies during the recent prevalence of small-pox. The news brings some misgiving. The production of a vesicle or pustule, resembling more or less that of variola, has commonly been regarded as essential to successful vaccination, and the extent of vesiculation—a total of half a square inch amongst four insertions—has been demonstrated statistically to be of value in respect of the duration of immunity. But the evidence of the worth of the subcutaneous method is as yet insufficient. As to immediate immunity, far more tests by subsequent scarification or incision are required. In the early days of vaccination the small-pox inoculation test and Bryce's test were applied on a very extensive scale in various parts of the world before testing was abandoned as needless. Also, as to the duration of immunity, it would be important to know whether many of the 6,000 troops and the children have subsequently chanced to be exposed to infection, and, if so, whether and how far they have succumbed. Possibly Dr. Goodall might give us the benefit of any experience he has had since the operations were performed. Science must always be prepared to accept new light, but the protection of humanity against small-pox is so tremendously important that the efficacy of subcutaneous injection of vaccine lymph should be proved very abundantly before being accepted as an alternative to a method the value of which has been demonstrated by the experience of a hundred and twenty years.

[1] Knoepfelmacher in Kraus and Levaditi's *Handbuch der Technik der Immunitätsforchung*, 1908, p. 683.
[2] *Indian Medical Gazette*, 1918.
[3] *Lancet*, 1919, vol. ii, pp. 285-6.

CALCUTTA SCHOOL OF TROPICAL MEDICINE.

THE long-term session 1922–23 of the Calcutta School of Tropical Medicine opened on October 16th. There was keen competition for admission. Only fifty places could be provided and eighty candidates applied; they came from all parts of India. Of the fifty seventeen were sent by the Imperial and Provincial Governments, and thirty-three were independent practitioners. The course will last for six months, and at the examination with which it will conclude a candidate must obtain 50 per cent. of marks both in the written and in the practical examinations. The equipment of the school, which is of the most modern type, includes a large laboratory for experimental pharmacology, where work is being done on the investigation of Indian indigenous drugs reputed to possess therapeutic value. The Hospital for Tropical Diseases is continually full, the demands upon it being in fact in excess of the accommodation provided. The out-patient department, which was opened in 1921, is also full to overflowing and already needs enlargement. The facilities for research work at the school are limited only by the funds at disposal; although the public has given generous financial support it is insufficient to meet all the demands of a promising programme of research work.

THE CAUSATION OF INDUSTRIAL ACCIDENTS.

A REPORT (No. 19)[1] issued recently by the Industrial Fatigue Research Board contains two contributions to the study of accident causation. A preface by the Board itself affords an interesting introduction to the very difficult and involved problem discussed by Mrs. E. E. Osborne and Dr. H. M. Vernon, who describe observations they made on accidents in relation to temperature and other conditions at two large shell factories. The temperature was registered continuously for periods of nine to twelve months by means of thermographs, and at the same time the accidents treated at the surgeries were tabulated. Immunity from accidents was greatest at 67° F.; at lower temperatures their frequency gradually increased till at 52° they were 35 per cent. more numerous than at 67°. At a still lower temperature (47°) they fell off slightly, perhaps because the workers were too cold to work with their usual speed, so that there was a consequent diminution of accident risk. At temperatures above 67° the accidents showed a small rise in the women, but the men suffered 39 per cent. more accidents at 77° than at 67°, their greater liability being due, in all probability, to the heavier and more trying nature of their work. Considerable doubt exists as to the causation of the gradual rise in accident frequency which commonly shows itself in the course of the morning and afternoon spells of industrial work. It is usually attributed to fatigue, but Mrs. Osborne and Dr. Vernon bring forward evidence which indicates that under ordinary working conditions fatigue plays but a very small part. It is true that when the women at a shell factory changed over from a 61-hour week of work to a 39½-hour week their accident frequency, compared with that of the men, who continued on the 61-hour week, fell off some 25 per cent., but since the war no women are called upon to work 61 hours, and indeed very seldom more than 48 hours. The chief controlling factors in accident causation are speed of production and the psychical state of the workers. This latter factor is suggested by the accident incidence of the night-shift workers at the munition factories, for they showed a maximum liability to accidents when they first came on to work. They were then for the most part in a lively and excited state, but as they calmed down in the course of the night accidents gradually fell to half the original number. The unimportance of moderate fatigue as a factor in accident causation is suggested by the laboratory experiments described by Professor B. Muscio in the second part of the Report. When a test involving moderate muscular activity (the pendulum test) was carried out continuously for a period of three and a half hours the accuracy attained improved throughout, though much more slowly in the latter half of the experiment than in the first half. There was no indication of loss of manual skill, such as might under industrial conditions have led to increased accident liability. Still, it is possible that if the test were continued for a longer time, and were repeated by other subjects, it might not always yield the result described. Another test (the aiming test) was tried at half-hour intervals during the course of the day; it showed a gradual increase in accuracy of performance during the morning, a relapse to minimum accuracy during the midday break, followed by another increase of accuracy during the course of the afternoon; but as the intervals between the tests were occupied with mental work it is doubtful whether the results obtained can be applied to continuous manual work.

[1] Medical Research Council: Reports of the Industrial Fatigue Research Board. No. 19, *The Causation of Industrial Accidents*. By Mrs. E. E. Osborne and Dr. H. M. Vernon. London: H.M. Stationery Office. (1s. 6d.)

HOSPITAL FINANCE.

A CONFERENCE arranged by the Federation of Medical and Allied Societies was held in London last week, to discuss the future financial stability of the voluntary hospitals. Lord Islington, in taking the chair, suggested that the hospitals should be relieved from certain public charges, such as local rates and legacy duties, and that contributions and donations should be allowed as a reduction for income tax purposes. Dr. Gordon Dill (Brighton), who opened the discussion, expressed the opinion that no reduction in the cost of voluntary hospitals could be expected, but rather an increase with the advance of knowledge. Though the voluntary hospitals were established for the benefit of the poor and necessitous, such persons now constituted only 25 per cent. of the patients. As they could not obtain them elsewhere the services of the hospitals were equally important and necessary to the remaining 75 per cent., who were not necessitous. The contributions from patients admitted to hospitals produced a large sum in the aggregate, but the average contribution did not amount to more than 12s. a week. The difference between what patients paid and what they cost was the largest item of hospital expenditure. The only way in which non-necessitous persons could pay for hospital treatment when it became necessary for them was by way of annual subscriptions during health. Beyond annual subscriptions, the ordinary income of a hospital consisted mainly of the proceeds from endowments and capital account, to which items of extraordinary income should be added. Dealing with the multiplicity and irregular distribution of the smaller hospitals, Dr. Dill, while admitting that hospitals for certain special diseases were necessary, raised the question whether the treatment of one particular organ of the body could not be as well and much more economically done at special departments of large general hospitals. A check should be placed upon the establishment of new hospitals without regard to the needs of the area. Much economy might be effected if hospitals would agree to make their out-patient departments consultative, except for the necessitous poor. All hospitals should strive for a closer agreement both on policy and in action. Viscount Hambleden (Chairman of King's College Hospital) agreed with Dr. Dill that there could be no finality in the expenditure of the larger hospitals, for the increase in size and number of special departments must go on. He thought that steps should be taken to encourage local practitioners to send patients to the out-patient departments; co operation between practitioners and the hospitals would ensure a certain saving. United action was necessary, and the arrangement of the approved societies for the payments of contributions in respect of their members while in hospital was a step in advance. Payments by patients did not represent 50 per cent. of the increase in the present maintenance costs. The Hospital Saving Association was prepared to launch a scheme for the regular collection of small subscriptions, either weekly or annually, from persons who used the hospitals; he believed that the future of the voluntary hospitals depended upon the success some such scheme could achieve, and upon the amount of co-operation which could be arranged between the hospitals.

Sir Arthur Stanley (Chairman of the Joint Council of the St. John Ambulance Association and British Red Cross Society) argued that if once the hospitals were divested of the elements of charity it would not matter whether the voluntary system were maintained or not. He commended the plan of the Hospital Saving Association. Mr. E. W. Morris (Secretary of the London Hospital) considered that it should be possible to reduce the expenditure much below the present cost, which was at the rate of £5 a bed a week. He thought that the scheme of the Hospital Saving Association was the only way in which voluntaryism could be saved. The alternatives were either to go back to disease, or for the State to take over the institutions. "Anything but the State," he said, "but the State rather than back to disease."

SOME OLD-FASHIONED REMEDIES.

SIR DYCE DUCKWORTH has contributed to the current volume of *Saint Bartholomew's Hospital Reports*[1] some notes "on the value and employment of some remedies now much forgotten or ignored." He sets forth in measured phrase his view that the medical scientist owes much to empiricism, and expresses his sympathy with the point of view of our ancestors, who, as physicians, pondered upon the effects of their remedies, and repeated their practice without undue eagerness to publish the results. He pleads that the changes in our therapeutic measures should not be too rapid either for the sick or for ourselves. Probably there are few practitioners who will regard as forgotten such drugs as arsenic and mercury, or turpentine or valerian, of which Sir Dyce Duckworth recalls some of the uses. But not many of the younger generation are likely to have prescribed musk or sarsaparilla. The art of using these drugs has, says Sir Dyce Duckworth, been lost; but he has satisfied himself that musk has great virtues in the treatment of severe cases of pneumonia, while in his opinion sarsaparilla is a restorative tonic in cachetic conditions and anaemia, though Professor Syme regarded its value as no greater than that of so much hay. Rhubarb powder has promoted healing in severe bedsores when other applications have failed; and Sir Dyce Duckworth is pleased to find that the mistura ammoniaci is retained in the *Pharmacopoeia* as a remedy for bronchitis in the aged. He mentions the value of poultices and of leeching; and with diffidence, as referring to a surgical matter outside his duty, a protest is entered against the *nimia diligentia* of the modern dresser and nurse, who in the cause of absolute asepsis too often disturb open wounds and ulcers. There is a pleasant old-world flavour in these notes, comparable to that afforded by reading a book by Jane Austen after a hectic course of modern psycho-analytic novels; and the reader feels that he is in the presence of a physician who has studied the art of treating the patient no less than the disease. This volume of the *Reports* contains also biographies, with portraits, of Dr. Wickham Legge, by "A. E. G." and of Dr. F. A. Bainbridge, F.R.S., and an essay on the life and works of Sir Astley Cooper (1768–1841) by Mr. Geoffrey Keynes.

THE GENERAL MEDICAL COUNCIL.

THE winter session of the General Medical Council occupied five days. It was an unusual session in that considerably more than half the time for which the Council sat was spent *in camerâ*. In little more than one morning and one afternoon the Council dealt publicly with eight disciplinary cases, adopted the reports of six committees, and transacted other business. For about thirteen hours it was concerned with one disciplinary inquiry in which the charges were of such a nature that it was decided, quite properly, to close the doors to the public and the press. The case appeared to arouse great interest among a certain section of the population of the East End, the neighbourhood in which the practitioner concerned carried on his practice, and the corridors and staircases were crowded with people, some of whom, by listening at any chink that offered itself, failed to respect the privacy of the Council's proceedings. Eventually, through the firm action of the Registrar, the place was cleared, and when at length the Council reached a decision and announced it publicly, the galleries were almost empty, and there was no demonstration, although this had appeared to be brewing. A full report of the discussion on Dr. Bolam's motion calling for an inquiry by the Executive Committee into any action the Council can take with regard to the prevalence of oblique or indirect advertising by medical practitioners in the lay press appears in the SUPPLEMENT, and we have commented upon it above. It was a difficult question to argue, because the advertising complained of is subtle and might even not be obvious at a first reading. Moreover, Dr. Bolam felt himself to be under the necessity of not mentioning any names, either of individuals or of journals. Yet he was able, in a masterly speech which was listened to with interest in all quarters of the Council, to put forward his points with sufficient explicitness to make every member understand what precisely it was of which he complained, and how widespread the practice had become. The Council is accustomed to hear the pleading of some of the most distinguished legal advocates, but Dr. Bolam's speech was a model even to them of logical and restrained advocacy. He was ably supported by Dr. Macdonald, Mr. Turner, and Sir Jenner Verrall, as well as by one or two others, but the discussion as a whole was ill-proportioned to the introductory speech because the Council was working under a time limit. If it had not been for the necessity of the closure another hour of extremely interesting discussion might well have been forthcoming on a matter of some public interest. The death of Sir Norman Moore cast a shadow over the proceedings of the Council. He was one of its best-liked figures. For more than twenty-one years he was the representative of the Royal College of Physicians of London on the Council. At the date of his resignation he occupied the position of treasurer, a place that is now to be filled by Sir George Newman. The news of his death was received while the Council was actually sitting, and though no extended eulogy was attempted it was evident that it came as a personal grief to the President and members. It had been noticed in recent sessions that his health was failing, but the members of the Council hoped that he had before him many years of retirement in which, as the President expressed it, he would find "health and fruitful occupation."

THE PRINCE OF WALES, having intimated his willingness to accept the Honorary Fellowship of the Royal Society of Medicine previously held by his father, was duly nominated and has been unanimously elected.

Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

The Committee of Medical Members.

THE medical members of the House of Commons inaugurated their team work in the new Parliament by a dinner in the House on Monday evening last. The members surviving from the last Parliament—Lord Dawson, Sir W. Whitla, Dr. F. E. Fremantle, Dr. Molson, and Dr. Elliot—were the hosts, although Lord Dawson at the last moment was unable to be present. Six other members completed the party—Dr. Chapple, who sat in the House from 1910 to 1918, Sir George Berry, Sir Sydney Russell-Wells, Sir John Collie, Dr. Watts and Dr. Salter. The three members absent were Dr. Molloy, Mr. Harvey-Dixon, and Dr. J. H. Williams. Dr. Fremantle was in the chair, and, in proposing the health of the guests, gave an account of the work of the Medical Committee in the late Parliament, referring with regret to their loss of Sir Wm. Watson Cheyne, Dr. Nathan Raw, Dr. Farquharson, Dr. Addison, Sir Robert Woods, and Dr. Macdonald. He sketched the work open to the new Committee in the present Parliament, the lines on which the members might co-operate, and the methods of making their procedure effective and comprehensive. He was supported by his fellow hosts, Dr. Elliot ending with a moving reference to the over-

[1] *Saint Bartholomew's Hospital Reports.* Vol. lv. London: John Murray. 1922. (Cr. 4to, pp. 180; 2 portraits.)

whelming responsibility of a member to his constituents for a share in the government of the whole State. All the guests replied in turn, each adding some original contribution and foreshadowing the divergence of view from Labour, Liberal, National Liberal, Ulster, and Unionist benches. The first meeting of the Committee will be held next Monday, when a chairman and honorary secretary will be elected. One matter of urgency was, however, raised: this was the proposed new regulation of the Nurses Council, whereby nurses or nursing home staffs would be precluded from registration, except such as had had at least one year's hospital training. It was thought this would act harshly, being against the spirit of the scheme under which a first register is made. Dr. Fremantle, Dr. Elliot (who is acting as secretary of the group), Sir John Collie, Dr. Salter, and Dr. Chapple were appointed a Committee to make representations to the Minister of Health.

The Work of the Pensions Ministry.

The cases of some 700 ex-service men whose insanity is held by the Ministry of Pensions to be in no way due to the war, and who are therefore being transferred to the charge of boards of guardians, were, on November 29th, again brought before the attention of the House of Commons by Mr. Lawson. The argument was put forward that, according to the finding of the Departmental Committee on Shell Shock, normal men were subject to neurasthenia and hysteria from the very fact that they were taken into the army, and that therefore these men should be treated liberally. Mr. Lawson submitted that medical boards were placed in a false position in being called upon to say whether the mental affliction of ex-service men was or was not due to the war.

Major Tryon (the new Minister of Pensions) welcomed the opportunity of making a fuller statement than was possible in the exchanges of question and answer across the floor. He reminded the House that he was bound by the warrant brought in by a previous Government a good way back not to grant pensions for more than a year after the termination of the war to men whose disability was in no way attributable to the war. The Government could not, without fresh legislation, give compensation longer to men whose disablement was neither caused by nor aggravated by the war. Most of the 700 men had not been overseas at all, and the cases which had been put before him by Mr. Lawson were cases of men who had not been in the army in England more than two or three weeks. Some of these recruits, it was discovered, had been in asylums once or twice before. Major Tryon added, however, that he was going through every one of the cases himself, and was considering the whole question to see if any way out could be found in view of the general feeling in the House. But without legislation it was not in his power to grant pensions to anybody when the disability was not due to the war. Major Tryon cleared up one other point. Not only was aggravation of disability already existing recognized, but when the aggravation was found the State accepted the whole liability, though only a portion, strictly speaking, appertained to it.

The Minister next came to the larger cares of the Department, referring to the 6,000 men provided for in the hospitals by the Ministry. Of all the cases that had to be attended to none, he said, caused more anxiety than those presenting mental instability and neurological disorders. The Department had obtained the services of a large number of medical men to deal with the difficult cases of ex-service men who had lost their will power. The policy of the Department was to hold on to these men to the very last possible moment; it was not for him to say that the Ministry had broken the law, but it had gone to its utmost limit in order to keep these men out of asylums. When such patients were certified under the law they could no longer be kept in the hospitals of the Ministry and had to be passed into asylums. But they were treated as private patients like those who were paid for by their friends. That was the case with about 1,000 men in the asylums; they were men whom it would not be safe for their relatives to take out. In those cases in which relatives could be allowed to take out patients the same allowance was given as for disabled men. He thanked the representative of every party in the House who had served on the Departmental Committee which dealt with this question; also the ex-service men who had been members of the Committee. The Departmental Committee recommended that the Ministry should set apart a separate wing in each asylum for ex-service men, but as gradings were needed this would, Major Tryon explained, mean practically the provision of a miniature asylum in the wing if the ordinary practice was to be followed. The Government was prepared to go into the question whether one or two special hospitals should be established for ex-service men. Such hospitals would have to serve large areas, and there was the difficulty that relatives might prefer to keep their sick within easy reach of them.

Major Tryon stated in reply to a question that the approximate number of beneficiaries under the Royal Warrants for war pensions on October 31st last, was 2,620,000 as compared with 3,135,000 twelve months previously. The total estimate of the expenditure of the department for the current financial year was £89,991,000 as compared with an approximate expenditure of £95,545,000 for the year ended March 31st, 1922.

Taking up further questions from December 4th, Major Tryon said that it was not practicable at the present date to give detailed information as to the membership of the Medical Board who examined men on enlistment. It would be remembered that in the earlier stages of the war men were examined by a single civil practitioner.

Mr. Pielou asked, on December 4th, if the Minister of Pensions would arrange that all doctors on tribunals should be independent, and not doctors transferred from the Ministry of Pensions. The Attorney-General (Sir Douglas Hogg) replied that all members of the Pension Appeal Tribunals, including medical members, were appointed by the Lord Chancellor and were quite independent of the Ministry of Pensions. To make service in the past under the Ministry of Pensions a disqualification for appointment would be to deprive the tribunals of some of the best available medical talent.

The Outbreak of Small-pox.—Major Boyd-Carpenter for the Minister of Health on November 29th stated, on inquiry by Mr. Gilbert, that cases of small-pox had occurred during the year in fifty-six districts outside London and in seven metropolitan boroughs. The number of cases discovered was 893, and the number of deaths 26. Of the cases discovered 278 had been vaccinated and 608 were either unvaccinated or showed no evidence of vaccination; in 7 cases there was no information as to vaccination. Medical officers of the Ministry had visited the districts in which cases had occurred in order to advise the medical officers of health. In reply to Mr. Frederick Roberts, on November 29th, Major Boyd-Carpenter said that the Ministry of Health had not issued any instructions or advice in favour of pressure being brought to bear upon persons to submit to vaccination. On November 30th he stated that in the London outbreak five unvaccinated children under 12 years of age had contracted the disease, and that three of them had died.

Unemployment and the Public Health.—In answer to Sir W. de Frece, on November 29th, Major Boyd-Carpenter, on behalf of the Minister of Health, said that some indication of the amount of sickness of all kind amongst the employed population of this country was furnished by the returns of expenditure by approved societies on sickness benefit under the Insurance Act. The increase in the number of weeks for which benefit was paid in 1921 as compared with the previous year was 1.4 per cent. in the case of men, and 8.4 per cent. in the case of women. Many factors must be borne in mind in making a comparison between the figures for the two years and, in particular, the serious epidemic of influenza about the end of the year 1921. The material in the possession of the Ministry did not make it possible to state to what extent the increase might be attributable to unemployment and reduced wages, nor to give comparative figures for different parts of the country.

Administration of Insurance Acts.—Mr. Gould asked, on November 29th, whether the Minister of Health would set up a committee to inquire into the administration of the Insurance Acts, particularly with reference to the panel system. Mr. Gould sought "an exhaustive inquiry with the object of obtaining such recommendations as would confer the greatest benefit for those for whom the scheme had been designed." Major Boyd-Carpenter gave assurance that the Minister of Health would consider the matter.

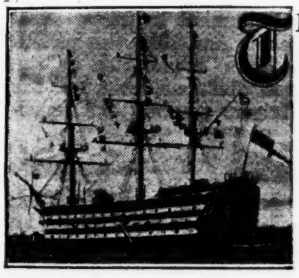
Certifying Factory Surgeons.—Mr. Robert Young asked, on December 5th, whether to ensure confidence in a doctor acting as certifying factory surgeon steps would be taken to prevent such doctor acting also at the same time in the capacity of compensation doctor for firms in the same area. Mr. Bridgeman said it would not be possible to lay down any general rule on the subject, because in industrial districts it was often difficult to find a well-qualified man who did not hold some appointment in connexion with employers or associations of workpeople. The consideration was, however, borne in mind in making appointments, and the Department was always prepared to inquire into any case of grievances that might be brought to its notice. An appeal could be made from decisions of a certifying surgeon under the Workmen's Compensation Act to the medical referees appointed under the Act.

Voluntary Boarders in Mental Hospitals.—Mr. R. Richardson asked, on November 30th, if the Board of Control had addressed a circular to the medical superintendent of registered hospitals stating that voluntary boarders might leave after giving twenty-four hours' notice in writing; and if, seeing that according to the statute the hospital superintendent had no right to demand any notice from any voluntary boarder, the statement would be at once corrected. Major Boyd-Carpenter said that the circular was addressed to the resident licensees of licensed houses as well as to the medical superintendents of registered hospitals. Section 229 (6) of the Lunacy Act, 1890, provided for twenty-four hours' notice in the case of licensed houses, and, although the Act was silent as to the notice to be given in the case of registered hospitals, it was, in the opinion of the Board of Control, reasonable to require the same notice. The circular suggested that the terms should be made clear to voluntary boarders on admission.

Defective School Children.—In reply to Mr. Groves, on December 4th, Mr. Wood said that Circular 1245, issued in January, 1922, conveyed a warning that restriction might have to be imposed during 1922-23 on expenditure on special schools; in Circular 1269, however, issued on July 5th, the Education Board intimated that existing schools for blind and deaf children could be used to the full extent of their accommodation, and that no restrictions need be placed on the number of children sent to these schools by individual authorities. The same arrangement applied to schools for crippled children, to open-air schools, and to schools for mentally defective and epileptic children.

THE MUNICIPAL COLLEGE, PORTSMOUTH.

NINETY-FIRST ANNUAL MEETING
of the
British Medical Association,
PORTSMOUTH, 1923.



H.M.S. *Victory* at her old moorings.

THE ninety-first Annual Meeting of the British Medical Association will be held at Portsmouth next summer under the Presidency of Mr. Charles P. Childe, F.R.C.S., Senior Surgeon to the Royal Portsmouth Hospital, who will deliver his Address on the evening of Tuesday, July 24th. The sectional meetings for scientific and clinical work will be held, as usual, on the three following days; the mornings will be given up to discussions and the reading of papers, and it is hoped to follow again the plan found so successful in recent years of arranging afternoon demonstrations in connexion with the work of each Section. The provisional programme for the work of the Sections is being drawn up by an Arrangements Committee, consisting partly of Portsmouth and Southsea representatives and partly of members elected by the Council. The Annual Representative Meeting will begin on the previous Friday, July 20th. The last day of the meeting—Saturday, July 28th—in accordance with custom, will probably be set apart for excursions to places of interest in the neighbourhood. The preliminary note published below is the first of a series of descriptive and historical articles on Portsmouth and its surroundings which it is hoped will prove of interest to members of the Association. The Association last met in Portsmouth in 1899, under the Presidency of the late Dr. John Ward Cousins.

SOUTHSEA: PORTSMOUTH.

The last three Annual Meetings of the Association have been held in university cities, each of them having its own medical school. Portsmouth and Southsea cannot offer the learned and scientific attractions of these great *almae matres*.

Southsea has not a medical school, but it is proud of its hospital, and it is proud of its municipal college. It also is proud in that it has been described as "the ideal South Coast health and holiday resort." The members of the Portsmouth Division are also proud that the Annual Meeting is to be held here and they offer a very sincere and hearty welcome to all their professional colleagues who can and will visit them in the latter part of July next. Southsea is one of the few British seaside towns that boasts of a perennial season, and it is unrivalled as a centre for land and sea excursions, and from

CLARENCE ESPLANADE, SOUTHSEA: THE JAPANESE GUN.

day to day it presents an unending variety of things to do and things to be seen. There are many fine and well-kept open spaces where outdoor games can always be had; there is golfing and fishing, swimming, yachting and boating in plenty. The climate is exceptionally even, mild, and bracing; extremes of temperature seldom occur; there is a maximum of sunshine, and the rainfall is not great, although there is a prevalence of westerly winds. There are splendid shops, good hotels and boarding houses, well equipped and up to date, well-appointed tea rooms and restaurants, theatres, music halls and cinemas innumerable.

Old Portsmouth and the dockyard have many historical and antiquarian relics to show, and relaxation after the scientific meetings can be found in many excursions to neighbouring spots of beauty and interest. The Isle of Wight with its charming hills, valleys, and villages is close at hand and easily accessible. Three cathedral cities can be visited—Winchester, Salisbury, and Chichester—as well as the grand old Abbey of Romsey, beautiful in its perfect proportions, "harmony and music in stone." The New Forest also claims a visit to its stretching heaths of furze and heather, its grassy banks and bracken glades, its fine and varied wooded parks with grand old timber trees, oaks of every size, great beeches, silver-clad birches, ashes, hollies, yews, and hosts of other smaller shrubs and trees with endless varieties of coloured flowers and mosses, countless swarms of bright and dull coloured insects, birds and beasts. From this forest came the oak that was used at Portsmouth to build the old ships of the "Royale Navie," the wooden walls of old England.

Portsmouth: Old and New.

Portsmouth town began its career at the south-west corner of Portsea Island, and has grown from a collection of a few wattled huts to a borough of a quarter of a million inhabitants. On the Isle of Portsea were at least three manors and several hamlets—namely, Portsmouth, Portsea, Landport, Southsea, Eastney, Fratton, Buckland, Copnor, Kingston, Milton, Great Salterns, and Hilsea. These have so developed and grown that they are now contiguous. Of this large and numerous family Southsea, though not the oldest, is by far the largest child.

Portsmouth was incorporated and made a borough by Henry I. The earliest charter in possession of the corporation is that granted by Richard I, and dated May 2nd, 1194. It begins "Richard, by the grace of God, King of England, Duke of Normandy and Aquitaine, Earl of Anjou, to the Archbishops, Bishops, Abbotts, Earls, Barons, Sheriffs, Bailiffs, Ministers, and all faithful people of his realms,—Greeting: Know ye that we have received into our hand our Burgh of Portsmouth." The charter further gives permission to hold a fair each year lasting for fifteen days, beginning on August 1st, to which all the King's subjects could come. Another privilege granted by this charter was the holding of a market every Thursday. For this charter the Burgesses had to pay yearly to the King's exchequer the sum of £18. King John also granted another charter, as also did King Henry III. Other privileges were granted in 1600, and again in 1627.

By the Local Government Act of 1888 Portsmouth was declared a county borough in the Isle of Portsea. On November 9th, 1904, Hilsea, formerly in the civil parish of Cosham, was added to the Portsmouth County Borough, thus bringing the whole of the Isle of Portsea under one administrative body. And by the Portsmouth Corporation Act of 1920 the whole of the civil parish of Cosham, situated on the mainland, was added to the Portsmouth County Borough. The total area of the borough is now 8,035 acres of land, and its population totals just over a quarter of a million.

Portsmouth has a court of Quarter Sessions, recorder, and coroner, and Petty Sessions are held daily at the Town Hall. The borough was represented in Parliament in 1295. Now under the Representation of the People Act, 1918, the parliamentary borough, which has the same boundaries as the county borough, is divided into three divisions, known as the North, Central, and South, each division sending one representative to Westminster.

Means of Approach.

The train service to and from Portsmouth is good—much better than it was—but there is still much that might be improved. The London Brighton and South Coast Railway and the London and South-Western Railway run frequent trains direct from their London termini to their conjoint stations in Portsmouth. There are three stations on Portsea Island. The first after leaving Cosham on the mainland is Fratton, and here most of the passengers for East Southsea alight. The second or central is Portsmouth Town Station, and is situated in Commercial Road. This is the terminus for many trains, but some pass on by the high-level line to Portsmouth Harbour Station, facing the Hard at Portsea. From here the Isle of Wight is reached by the Conjoint Railways' Boat Service.

On other lines, through carriages are run from the Midlands via Basingstoke, from Cardiff via Bristol and Salisbury, and from Plymouth via Exeter and Salisbury. Brighton and Bournemouth are also directly connected by rail.

There are also good road approaches for motorists. The old London and Portsmouth road, through Guildford by Hindhead and Petersfield, is generally in very good condition. This road was well known to Charles Dickens, who was born in Portsmouth. Nicholas Nickleby and Smike tramped the old Portsmouth road and entered Portsmouth by the old Landport Gate.

Naval Dockyard and Harbour: H.M.S. Victory.

Portsmouth possesses the largest naval dockyard in the world, and its harbour is the home of the British fleet. To write a history of Portsmouth would be to write a history of the British Navy, and to write the history of the British Navy would be practically to write the history of the British Empire. For many years the most conspicuous object to be seen in the harbour was H.M.S. *Victory*, Nelson's famous flagship at the battle of Trafalgar, October 21st, 1805. She used to ride at her moorings in mid-stream, a thing of beauty and a joy, a revered relic of the old wooden line of battleships which gained for Britain the glorious victories of the last century. Alas! owing to the decay of her keel, ribs, and timbers below water-line she has had to be docked. She has been thoroughly surveyed and overhauled and placed in dry dock by the Admiralty. Here, propped up in her iron cage, she may yet be visited and a holy pilgrimage made to "the spot where Nelson fell"; to restore her, large free-will offerings will be required from those who treasure her great traditions. The harbour and the Solent are always alive with craft. Super-dreadnoughts, torpedo boats, and submarines are constantly passing to and fro, always ready to obey the slightest call of Empire's duty.

Amenities of Southsea.

The large residential part of Portsmouth known as Southsea has a long sea front facing the silvery Solent, which separates it from the Isle of Wight, and between the terraces of houses and the Parade is a large open common, where there are plenty of sea breezes and a maximum of sunshine, which has justly earned for Southsea the title "sunny"; 2,065 hours of sunshine were registered by the Campbell-Stokes recorder for the year 1921. The greatest amount registered in one day was 15 hours 20 minutes on June 28th.

The common provides a glorious playground a mile and a half long between the two piers, and practically, except in name, there is a continuation of this open space for another three miles on past Eastney to Hayling Ferry. Between the common and the sea is a good road and a fine promenade four miles long, and along it in different sections can be found something to appeal to every phase of holiday mood.

At the west end of the promenade is the Clarence Pier, a place of call for the railway company's boats when crossing to the Isle of Wight, and a centre for steamboat traffic to Southampton and Bournemouth. On the pier is a concert hall capable of seating over 2,000 persons. The stretch of beach from here to Southsea Castle is always full of life —hundreds of visitors and children, boaters, bathers, and paddlers, Punch and Judy, concert parties, conjurers, photographers, and the old veteran with his telescope, all help to make an animated and ever-moving picture. On the esplanade near the Clarence Pier will be found the old anchor of the *Victory*, and many other objects reminiscent of past wars. Well to the east, about halfway along the promenade, is the South Parade Pier, the property of the corporation. It was opened in 1909 and replaces an older structure destroyed by fire in 1904. The pier is 600 feet long, exclusive of the landing-stage. It has a large pavilion with a stage for concerts and theatrical plays, a minor hall, and an out-of-doors bandstand. Here are often heard the finest military bands. Amusement is always to be found on the pier and on the beach by its side. On the pier concert parties, theatrical parties, and other entertainment parties are always in evidence. Steamboats start from the landing-stage for Ryde, Cowes, Sandown, Shanklin, Ventnor, Sea View, and Bembridge. Beaulieu may also be visited from here, and sometimes Brighton, Bournemouth, Weymouth, and Cherbourg. Close by the pier is the canoe lake and garden, where tennis, croquet, and bowls can be enjoyed.

The View from the Castle.

Between the two piers stands Southsea Castle, originally built by Henry VIII, but strengthened and enlarged in the reign of Charles II. It is from this castle, situated to the south of Portsmouth on the sea, that Southsea is supposed to have taken its name. It is a place of considerable importance, because any vessel wishing to enter Portsmouth harbour has to approach close to the coast at this point—if friend the castle lighthouse will be its guide, if enemy the castle's heavy guns would speak with no uncertain sound.

In front of the castle is a magnificent view. Gigantic liners, battleships and cruisers, fussy torpedo boats, submarines, waterplanes, motor boats, barges, and sailing yachts are constantly passing to and fro, and four miles away across the silvery Solent lies the Isle of Wight with its beautifully wooded shores rising from a silvery sea, running upwards and backwards towards the great down. Seldom does a town look prettier than Ryde as we see it from the sea: Sir Gilbert Scott's spire of All Saints' Church crowns the hill in the background; all the other buildings are unobtrusive, and the splendid woodlands on either side blend with and fade into the town itself, making a charming picture. Looking towards the east we see Sea View and Bembridge, with its Ledge and lightship, and farther on out at sea one of the mystery towers. Towards the west the towers of Osborne are often visible.

From our vantage ground in front of the castle we are looking on the world-famous anchorage, Spithead, where Britain's fleets have anchored for centuries. From here they have sailed to fight the glorious battles that have helped to make the British Empire what it is. From this very beach Nelson embarked when he sailed on the *Victory* to fight at Trafalgar, and from Spithead the Grand Fleet sailed away in August, 1914, to its unknown destination.

For the loan of the two larger blocks we are indebted to the courtesy of Messrs. Charpentier, Ltd., Portsmouth.

INSULIN AND DIABETES.

ADDRESS BY SIR CHARLES SHERRINGTON, G.B.E., PRESIDENT OF THE ROYAL SOCIETY.

SIR CHARLES SHERRINGTON, in his presidential address at the anniversary meeting of the Royal Society on St. Andrew's Day (November 30th), made the following references to the action of insulin and its possible use as a therapeutic agent in diabetes mellitus:

"In the Physiological Laboratory of Toronto University has been prepared a pancreatic extract possessing striking power over the carbohydate metabolism of the body.* Potent as it is, experience with it is still limited. Work of urgency is required with what may prove to be a desired remedy; the first programme is further investigation of the extract's full properties, with caution as to raising hopes which practice may but partly fulfil. Such are the considerations which weigh with the Canadian—and the discovery is Canadian—university to whom the discovery is due. In this country the Medical Research Council has undertaken public-spirited direction of the extract's preparation and of further determination of its properties.

"The physiological steps of the discovery may be briefly outlined thus:

"Destruction of the pancreas is well known to produce in the dog a diabetes-like condition, rapidly fatal. The liver's store of glycogen is lost, and cannot be renewed by even liberal supply of its normal source, carbohydrate food. Sugar formation from proteins ensues, with rapid wasting of the tissues; at the same time the blood is surcharged with sugar, and the tissues are unable to make use of sugar. In a normal animal, glucose put into the circulation raises the ratio of CO_2 expired to oxygen absorbed, because the tissues consume the sugar. But glucose similarly introduced into the depancreated diabetic animal does not raise the respiratory quotient; the tissues no longer consume the sugar.

"The inference has long been that the pancreas produces some substance enabling the body to make use of sugar—some substance that in fact should control certain forms of diabetes. At Toronto there seems to have been secured the extraction of that substance.

"The pancreas consists of two structures intimately commingled: the one, secreting cells set round ducts into which they pour the pancreatic juice, potently digestive; the other, scattered in tiny islets seemingly unrelated to the ducts though closely related to the blood channels. The want of success of pancreatic extracts in mitigating a diabetic condition might be due to digestive powers of the juice cells destroying an antidiabetic substance of the islet cells. Dr. F. G. Banting determined to avoid this possibility by preparing extracts made from the pancreas after its trypsin-yielding cells had been selectively brought to atrophy by ligation of the gland ducts.

"He and Mr. Best, a collaborator who joined him, overcoming formidable difficulties of technique, succeeded in preparing the required material, and in examining the effect of

* A paper by Professor Macleod of Toronto on Insulin and Diabetes, containing a general statement of the physiological and therapeutic effects of insulin, was published in this JOURNAL on November 4th, 1922, p. 833.

extract upon diabetic depancreated dogs. They found the sugar fall both in the blood and urine, and that the animals, instead of dying in three weeks, remained, while treated, in excellent condition. The further prosecution of the work subsequently engaged other collaborators; to mention them in alphabetical order, Collip, Hepburn, Latchford, Macleod, and Noble; of these Professor Macleod, himself Director of the Toronto Physiological Laboratory, is well known as a skilled authority in experiments on carbohydrate metabolism, and Dr. Collip is Professor of Bio-Chemistry in the University of Alberta, though temporarily working at Toronto. With team work advance has proceeded relatively quickly, and successful extracts are now obtained from ordinary ox, sheep, and swine pancreas.

"Of much physiological interest is the fact that the active principle in the extract seems one *normally* controlling the blood sugar in health; its injection rapidly lessens the blood sugar in normal animals. The extract, added to a simple perfusion fluid containing a little glucose and streamed through the isolated rabbit heart, increases three- or four-fold the heart's uptake of sugar from the fluid. The extract sometimes evokes serious nervous disturbances seemingly associated with extreme fall in the amount of the blood sugar. Administered to diabetic depancreated animals, the extract brings reappearance of the liver's glycogen store, while bringing down the sugar excess in the blood and the excretion of sugar and acetone in the urine; and it enables the diabetic organism to consume sugar. It also lessens or prevents hyperglycaemia produced in animals in several other ways. Gratifying success has already attended the use of this extract in the relief of diabetic patients; much further research is, however, yet needed for development of the methods of extraction and of the routine use of the active principle.

"The important physiological advance thus just reached comes as a fit reward to those who have achieved it. It is, of course, the striking crowning of steady work pursued by many various workers through many earlier years. Such work, we may remember, lay often open to charge by the unenlightened of being merely academic and fruitless, its reward being at the time simply the intrinsic scientific interest of the facts obtained. The Toronto investigators, we may be sure, would say with Pasteur, 'To have the fruit there must have been cultivation of the tree.' Part of the merit of the recent successful investigation has been its appreciation of possibilities indicated by previous work. But that merit is after all only a preliminary to the main achievement. The actual achievement is the deserved success of a bold attack conducted with conviction and determination, and carried through in the face of formidable experimental difficulties. High praise is due to Dr. Banting and Mr. Best and to their collaborators."

Paris.

[FROM OUR CORRESPONDENT.]

Statistics of Students in Paris.

THE University of Paris has just published the comparative statistics of students who were matriculated on July 31st, 1921, and on July 31st, 1922. In 1921 they reached a total of 21,185, of whom 17,993 were men and 3,192 women. In 1922 the total rose to 21,612, of whom 18,066 were men and 3,546 women; taking both sexes together there was an increase of 427. In the Faculty of Medicine the roll of male students has diminished by 302, but that of women has increased by 55. At present there are 4,639 medical students, of whom 738 are women. Of the total, 811 are foreigners, 113 less than in the previous year. This appreciable diminution is due to the conditions of exchange which affect Central Europe. Countries with a high exchange only exceptionally send us matriculated students who follow our regular course of study. It is unnecessary to look beyond the explanation of the fact mentioned in my last communication in this JOURNAL (November 4th, 1922, p. 891) to understand how it is so few English medical practitioners have a legal right to practise in France.

Dr. Alfred Martinet.

The death is announced of Dr. Alfred Martinet. He was a unique figure, a man so great that it can truly be said that his fame extended far beyond the frontiers of his own country. He was born in Paris in 1868, of a family in less than modest circumstances, and was reared in the stern school of poverty. He began life as a clerk, and was afterwards a teacher. His leisure was devoted to the study first of mathematics, then of medicine, which had an irresistible attraction for him. He began his medical studies at an age when his contemporaries were finishing them, but his inflexible will surmounted all obstacles, and it was in teaching others what he himself had just learned that he gained enough to make it possible to start practice in a northern district of Paris. There for some twelve years he worked in obscurity—his only recreation to bring his observations to a definite point and to drawing conclusions from them that he could summarize in plain terms. The publications in which he placed them before his colleagues were clearly written and as full of common sense as of science; such were his books on drugs in common use, common diets, arterial pressure, and the viscosity of the blood. What characterized Martinet was, on the one hand, his system—a veritable Taylorization of medicine—and, on the other, his ambition himself to play the part of the specialist in his own consulting room, whether the question were one of chemistry, radiology, bacteriology, or the examination of the heart. His system and its results are set forth in his principal works, *Les Eléments de Biométrie*, his treatises on clinical therapeutics, and above all, that on clinical diagnosis, which was translated into English (in America) and into Spanish. One day Martinet awoke to find himself famous; the Faculty of Medicine gave him the opportunity of conducting an open course of lectures, and students and practitioners struggled for places. At the same time his private practice increased enormously, and the consulting room of a suburban practitioner became as that of the leading consultant in Paris. Patients flocked to him from all over the world, until Martinet was unable to cope with their number. He remained perfectly unassuming, caring neither for honours nor for money. His whole life was in his art. He can be reproached for one thing only, that he did not apply his own system to himself and did not recognize the limit of his strength. He is dead, stricken down in the midst of his work, his death due to the greatness of his exertions. A great brain has ceased to function, and the work that he leaves us as a legacy yields place only to the example that he gave us.

The Academy of Medicine.

Why have you not an academy of medicine in London? These *compagnies* have an indefinable charm; tradition finds in them a last refuge, and memories of the masters who are no more give to the discussions of the present day a sense of permanency that helps us to understand that art is long and life is short.

At its last meeting the Académie de Médecine returned to a question which has been under discussion since 1849—the relation of tuberculosis to pregnancy. Professor Bar asked whether it was justifiable to interrupt pregnancy when the woman was suffering from pulmonary tuberculosis. After a methodical examination of the problem he came to the following conclusion as a guide in practice: "If I find in a patient not far advanced in pregnancy only a slight cutaneous reaction to tuberculosis, while the state of the tuberculous lesions is such as should leave her strong enough, my inclination is towards intervention." Let it be noted that M. Bar is a professor of obstetrics, and that we are not accustomed to find the obstetric wind blowing from that quarter. Let us also listen to Pinard! There he is on the platform! A fine young old man is honorary professor Pinard, who has just carried from his professorial chair to the tribune of the Chamber of Deputies the enthusiasm which has made him the apostle of Life. "No," he says, "do not sacrifice to-morrow's seed. Take care of the tuberculosis and watch the pregnancy." And as Professor Sergent had declared, "My conscience does not allow me to sacrifice the mother to save what is still only a foetus. . . ." Pinard finds in his heart an eloquent apostrophe: "It is still only a foetus! Such language cannot be listened to without protest, for in these precincts the child, from the moment it is formed, has a right to the respect we owe to every human being. It is defenceless, small, and feeble, and on that very account ought more than any other being to be protected. It is only a foetus! How many times have I heard that horrible phrase!" And Pinard went on to point out that similar assertions will soon be found in the briefs and in the pleadings of barristers defending abortionists before a jury. "As for myself," he said, "I have never committed foeticide." Noble and beloved

master, your voice rose there to the height of your convictions! The question is serious. The public hears an echo of it in the daily press. It will go on so long as there are academies of medicine, for mixed up with the clinical problem is a question of conscience.

The Medical Society of the Hospitals.

At a few paces from the Academy is the little hall where the Société Médicale des Hôpitaux meets. The atmosphere here is quite different. Eloquence is not in fashion. To this society facts are brought, and the meeting consists solely of clinicians, the physicians and surgeons of our Paris hospitals. A curious discussion is here being thrashed out between Netter and Comby, two of the best known specialists in diseases of children. Netter defends the opinion of Bokay (1892) that chicken-pox and certain forms of herpes zoster are identical; Comby exclaims against an opinion he qualifies as *incroyable*. Netter relates instances of herpes following chicken-pox, other cases of chicken-pox following herpes, the latter observed in patients in bed and under observation, or in hospital in isolation wards; others again of nurses attacked by herpes, who transmitted chicken-pox to their nurslings, and one instance in which generalized chicken-pox developed in a patient on the fourth day of an attack of occipital herpes. Netter quoted the precise observations published by Dr. Elliott in the *Glasgow Medical Journal* in May, 1922. "Mere coincidences," replied Comby. But the eloquence of positive facts (not experimental, it is true) swept away negative arguments and recalled the epigram of a prisoner: "You bring here two witnesses who saw me; I can bring 2,000 who did not see me!"

Canada.

McGILL UNIVERSITY, MONTREAL.

THE new biological building, the erection of which was made possible by a gift of the Rockefeller Foundation, was formally opened on Thursday, October 5th, when Sir Charles Sherrington, M.D., F.R.S., Waynflete Professor of Physiology at Oxford and President of the Royal Society, was the chief speaker. Addresses were given also by Dr. Harvey Cushing, Dr. H. J. Hamburger (Groningen), and Dr. J. N. Coulter (Chicago). Representatives from other universities included Dr. Mendel and Dr. R. H. Chittenden of Yale, Professor J. J. R. Macleod of Toronto, and Dr. Simon Flexner, director of laboratories, Rockefeller Institute, New York. The degree of LL.D. was conferred upon Sir Charles Sherrington at the special Founder's Day Convocation.

War Memorial.—The memorial window given by the members of the teaching staff of the Medical Faculty in honour of three members of the staff who gave their lives in the war was dedicated on October 5th. It commemorates the life and work of John McCrae, Roland Playfair Campbell, and Henry Bridges Yates.

Medical Faculty.—Dr. George F. Armstrong, C.M.G., Professor of Surgery and Clinical Surgery, has been elected Dean of the Faculty of Medicine for 1922–23. The number of students enrolled in the Faculty for 1922–23 is 719.

Dental Faculty.—With the reorganization of the dental clinic at the Montreal General Hospital, McGill becomes one of the chief dental centres on this continent, with a clinic following in closer relation to hospital work than almost any other. The number of dental students registered for 1922–23 is 130.

Pathological Institute.—Ground has been broken for the Pathological Institute, which will be affiliated with the Departments of Bacteriology and Medical Jurisprudence. The building will be constructed of stone and will have three stories and a basement. There will be adequate laboratory equipment and facilities for all these three branches of medicine.

First Women Graduates.—The first five women to graduate in medicine from McGill received their degrees in June, 1922. Two out of the five competitive prizes offered were won by them: one, the Wood gold medal for clinical subjects, by Miss Jessie Boyd; and the other, the First Senior Prize offered by the Undergraduate Medical Society, by Miss Winifred Blampin for a paper on thrombosis. All have been given hospital posts, Miss Eleanor Percival and Miss Mary Childs going to the Montreal General Hospital, Miss Jessie Boyd and Miss Lillian Irwin to the Royal Victoria Hospital, Montreal, and Miss Winifred Blampin to the Women's Hospital, Philadelphia.

Scotland.

EDINBURGH ROYAL INFIRMARY.

THE annual general meeting of the League of Subscribers to the Edinburgh Royal Infirmary was held on November 30th. Mr. James Campbell, who was in the chair, said that it was to the credit of everyone concerned that the league had made such great progress during so difficult a period. The organizing secretary, in submitting the fourth annual report, said that £18,333 had been collected from the various groups of subscribers, comprising employees engaged in public works and business establishments, together with the staffs of schools and Government offices. Compared with last year's figures the contributions from Edinburgh and Leith showed a decrease of £116, but the country subscriptions had increased by £641. Unemployment and short-time working had had an adverse effect on voluntary contributions; nevertheless the individual membership of the league now stood at 67,000 for Greater Edinburgh and 18,000 for the country districts. It was hoped that in more prosperous times the annual offering to the Royal Infirmary might be not less than £20,000; to this would fall to be added the voluntary fund raised in a similar fashion by the miners and oil workers in the coal and shale areas of the district. Sheriff Crole said that the number of patients in the infirmary last year was 14,156, as against 13,600 in the previous year; the daily average was 876, and the highest number for any one day was 914. In the out-patient department 42,342 people had been treated—about 1,000 more than the previous year. Property had been bought in Grange Loan for the purposes of the new convalescent home, and upon one portion, of which possession had already been obtained, a department for female convalescents was being prepared. This was part of the scheme to which the money left by the late Mr. Ainslie for a convalescent home was being devoted; the interest on this estate had been accumulating for some years, and it now reached the figure of £600,000. This year the infirmary's finances would have a substantial balance to the good; it was estimated that from the workers alone £34,294 had been received in voluntary contributions. This year the expenditure amounted to £119,000; last year it was £133,000, so that there was a decrease of £13,500.

CHRISTIAN SCIENCE.

Dr. W. L. Reid presided at the meeting of the Glasgow Medical Lunch Club on November 30th, when the Rev. A. Boyd Scott, M.C., B.D., was the guest of honour. In addressing the members Mr. Scott referred at the outset to the close relationship between the minister and the medical practitioner, and said that in these days both were threatened and assailed as never before by common assailants. Several of these came under review, but in particular the lecturer dealt with the cult of M. Coué and his disciples and with the Christian Scientists. He gave a very complete and interesting exposition of the fundamentals of these two schools, which he regarded as foes alike of the minister and doctor, each of whom had enough to do in their daily round without the constant irritation occasioned by the insidious teaching and doctrine of such opponents. He pleaded for a closer bond between priest and practitioner in resisting the spread of these pernicious influences, and for a revival in the Church and the world of sane faith, and a more wholesome appreciation of the divine splendour of medical science. Dr. F. W. Martin expressed the pleasure and thanks of the members for the very able and interesting address.

GLASGOW VICTORIA INFIRMARY.

The report presented to the annual meeting of the court of contributors to the Glasgow Victoria Infirmary on December 7th pointed out that there was a deficit of £2,968 in the accounts as between ordinary income and ordinary expenditure. The ordinary income for the year was £41,754, and the ordinary expenditure £44,722, while the extraordinary income (legacies, special donations, etc.) was £41,855. The number of patients treated in the wards was 4,230, as against 4,348 in the previous year—a decrease of 118. The contributions received during the year from patients amounted to £770, as compared with £1,139 in the previous year—a decrease of £369. The Bellahouston Dispensary continued to render splendid service on the south side of the city, and at the convalescent home at Largs 556 patients were treated during the year.

Ireland.

PUBLIC HEALTH LEGISLATION NEEDED.

ON the motion for adjournment of the Provisional Parliament Sir James Craig, M.D., President of the Royal College of Physicians of Ireland, received permission to raise a matter of importance dealing with public health.

Sir James Craig's Speech.

Public health conditions in Ireland, he said, were not all that they ought to be. Prevention was a great deal better than cure. Sanitation had already done wonders for the country within the last thirty years in preventing disease. There was now virtually no typhus fever in the country, and typhoid fever was also becoming extremely rare. Diphtheria had been robbed of nearly all its terrors, but an invasion of small-pox threatened. He congratulated the Local Government Board and its medical department on the efforts already made to secure vaccination at the seaports. He was not going to raise the question of the usefulness or otherwise of vaccination, but he would consider himself a criminal if he attempted to treat a small pox patient without being himself vaccinated, or if he allowed a nurse to care for such a case without being vaccinated.

Under the Ministry of Health Act passed in England in 1919 an Irish council was formed with power to take such evidence as it wished from people interested in public health and to draft a bill. That council, which was a representative one, found that there were five or six bodies dealing with public health in Ireland, and its first recommendation was that some attempt should be made to co-ordinate these bodies. The Irish Health Council recommended that there should be centralization, and that it should take the form of a Ministry of Health. He would not press that at the moment, but would be content for the present with the centralization of the public health work under one ministry; he had no objection to the Local Government Board being in charge of all these services. The council recommended the unification of local systems. It suggested that the county should be the local unit, and should be made responsible for all the sanitary work in the area. The council had pressed for the appointment of a superintendent medical officer of health for the county, or group of counties, who should be absolutely independent of private practice, and for assistants who would do the minor work. Another recommendation was that the present dispensary doctors who were working under boards of guardians should be entirely detached from the workhouse system. There should be a district hospital or home in every district worked by those who represented the present dispensary doctors, and there should be district nurses who would assist in tuberculosis work, child welfare, and, perhaps to a certain extent, in school inspection work. It was felt that there should be a county hospital, with a first-class surgeon; this would necessitate the establishment of an Irish medical service, entrance to which would be gained by open competition. It would be necessary that the men in this service should be paid not only a decent salary but that there should be a chance of promotion. An effort should be made to secure proper attention for the insured, who up to the present had not been getting the attention they deserved. He hoped that in any future legislation the Local Government Board would continue to encourage the appointment of a local ladies' committee to employ and take an interest in the nurses in the district, and that they would get a subsidy from the funds of the Government to keep the work going. He hoped, also, that the Government would make use in the future of the institutions already existing for the training of nurses.

In conclusion, Sir James Craig asked whether the Irish Health Council was going to be continued or not, or whether the Minister for Local Government had in view the formation of a council on some such lines as those set out in its report. Was it, as a matter of fact, functioning at present, or had it been dissolved, or would an advisory Council be provided for in any future legislation? He had heard that a bill was being prepared, and he would like to ask whether that were so or not, and whether the bill was being formulated on the lines recommended by the council. He desired to ask the Minister whether it would not have been better to take a line from what had been done in other departments—namely, to form a committee or commission to bring this report up to date before he began to legislate. It would have been well had the Minister appointed a commission to give him advice as to the proper legislation required. Finally, if this bill was in process of preparation, he desired to ask the Minister, when it was prepared, whether he would give those interested in public health an opportunity of discussing it before it came before the Dail for consideration.

Other members having spoken of the urgent necessity for medical inspection of school children, the Minister for Local Government, in his reply, intimated that a beginning had been made to do some of the things which Sir James Craig wanted done. Something had been done in the way of centralization, as three of the four officers concerned with public health were now included in the Ministry of Local Government. The abolition of the workhouses had separated the dispensary system from the workhouses. The question of State medical services would have to be further considered. The Public Health Council was in a state of suspended animation, but it was intended to have an advisory body of that kind. The bill which was at present being prepared would legalize formally the work of Poor Law reform carried through during the past couple of years. When it was passed the permanent legislation necessary for the reform of local administration generally, including other services as well as public health, would be considered. The question of the medical inspection of school children was under consideration. The inspection of barracks was a matter for the Minister of Defence; but if he were that Minister he would not allow the local sanitary officer to go near them. The army had its own doctors, who were just as anxious for the public health and for that of the army as any local doctor.

Correspondence.

THE TEACHING OF PSYCHOLOGY AND PSYCHOTHERAPY TO MEDICAL STUDENTS.

SIR,—In your issue of August 19th, Dr. R. Macdonald Ladell states, "I am rejoiced to read that at the recent meeting of the British Medical Association in Glasgow a resolution was passed by the Section of Neurology and Psychological Medicine advocating the addition of psychology to the student's curriculum. This marks a big advance in the right direction." There is, however, much to be said against it, and I regret that, as a university teacher of many years' standing, and one who has all his life been a close student of the nervous system, it has become my duty, in default of abler protest, to sound a warning note.

Before any such introduction is made into an already overburdened medical curriculum, university authorities should satisfy themselves on three points: first, what is it exactly that is going to be taught; secondly, what knowledge has the proposed lecturer of the histology, physiology, and diseases of the nervous system; and thirdly, who is going to teach it.

As regards the first point I do not think the members of my profession realize the amount of rubbish that is now disseminated as psychology. Let the following example suffice.

From the 367 pages of Varendonck's *The Psychology of Day-Dreams* the following is selected, simply because it appears in the index as "Day-dreams, definition of." On turning this up we read:

"Day-dreaming as a process is a manifestation of the universal energy. If we now examine the day-dream as a product of affective thinking on the fore-conscious level we cannot deny it a teleological character. Like nocturnal dreams, day-dreams betray preoccupations with unsolved problems, harassing cares, or overwhelming impressions which require accommodation, only their language is not sibylline as that of their unconscious correspondents. Moreover, their end-representation is oftener of a more immediate and topical character. But they all strive toward the future; they all seem to prepare some accommodation, to obtain some prospective advantage of the ego; in fine, they are attempts at adaptation; such is their biological meaning."

It is a relief to know that there is a meaning. Personally I had not suspected it.

On page 173 of Lay's *Man's Unconscious Conflict* we read:

"Not satisfied with the materialistic interpretations put upon dreams by Freud, Jung thinks that they have not merely a retrospective meaning, but have a meaning for the present and a value for the future. Freud is criticized by Jung for tracing too much of the dream back to the period of infancy, and to exclusively sexual causes. . . . Jung therefore sees in the dream not only a psychic product absolutely determined by preceding causes in the strictly scientific sense of to-day, but regards the dream as an aspiration toward a higher form of intellectual and spiritual life."

It seems almost too brutal to point out that many dreams are aroused in a brain from which sleep has removed the control of the outer cell lamina, as the result of enteroceptive impulses coming in from a distended stomach or seminal vesicle, or proprioceptive impulses from the pressure of the bedclothes.

Aural Kolnai gives the case away on page 45 of his *Psychoanalysis and Sociology*, when he says quite bluntly that psycho-analysts refuse to commit themselves to any physiological interpretation of the phenomena they investigate. He is also, apparently, an upholder of the ridiculous and indecent Œdipus complex, which he defines as "the (usually

unconscious) desire of a son to kill his father and possess his mother."

As regards psycho-analysis the following extract will make it clear that the days of its utility to the medical profession are numbered. Baudouin says on page 187 of his *Suggestion and Auto-suggestion:*

"Everyone can verify the efficacy of the method" [that is, auto-suggestion] "for himself by applying it in minor troubles, thus ascertaining if he has grasped the correct procedure. You wish to stop a haemorrhage, nose-bleeding for instance? If this nose-bleeding ordinarily lasts a quarter of an hour, with intermissions, you should readily be able to secure the formation of a good clot and the arrest of the haemorrhage within two or three minutes. Attain collectedness, and make use of some form of special suggestion. You can place a watch in front of you and keep your eyes on the second-hand, having fixed a time in your mind when the bleeding is to stop. You *ought* to be successful; and if you fail, it will be because your method is still faulty, because you have overlooked some detail. In like manner, if you are subject to colds in the head which usually last a week, suggest to yourself that the trouble will pass over in four days. At a later stage you can forbid the catarrh to develop at all. You can dictate to an abscess the moment when it is to burst. *Without any other treatment than* auto-suggestion, you can cure pimples, warts, varicose ulcers, eczema."

And yet in the Middle Ages men were burnt at the stake for telling the truth.

It may be objected that the examples cited are from the writings—perhaps "wanderings" would be a better word—of lay people. This is readily admitted, but it shows the extraordinary fantasies to which psychology may lead, and, what is worse, there are signs that this "sloppy thinking" is permeating the medical profession, and the time has come to ask the reasonable members of that profession to get back to nature. Get back to the natural facts of the nervous system. Let medical men who psycho-analyse dreams read their physiology first, and remember that dreams are merely afferent impulses from enteroceptive, proprioceptive, and exteroceptive sources running riot amongst the cells of a brain where control has been removed by sleep, and that beyond the fact that a dream is a jumbled-up and disorderly manifestation of previously acquired afferent impulses, stored up in granular and short association cortical cells, it has no psychological significance whatsoever.

To the scientific study of the phenomena of mind there can be no possible objection, always provided it is based on a thoroughly sound knowledge of the nervous system, not only of man, but of vertebrate animals also, and this knowledge, this modern knowledge, the lay psychologist has not, nor does it appear that some of his colleagues in the medical profession are much better off in this respect.

From the luxuriant mass of verbiage in which the psychologist delights there occasionally emerge a few facts worthy of investigation. My experience has been that neurology can explain these facts better than can psychological speculation, and, as a university teacher, it is my duty to insist that those who are to teach psychology to medical students shall at least have an adequate knowledge of the functions and diseases of the nervous system, and that their theories shall accord with known facts.—I am, etc.,

RICHARD J. A. BERRY, M.D.

University of Melbourne, Sept. 29th.

PSYCHO-ANALYSIS.

SIR,—Dr. Steen's letter in your issue of November 18th (p. 998), in regard to cases of morbid fear, etc., is of great interest to me as I have treated many successfully by convincing their reason that their fear was unfounded and teaching them how to overcome it. This, of course, necessitates the consideration of the plan to be adopted in each case. For example, a young girl was brought to me at the out-patient department of St. Thomas's Hospital who had been unable to leave the house alone for some months. She was directed to go down the steps of the house into the street and return; she would, of course, see that nothing had happened; then to go five steps along the street and return, then ten, and so on. She came alone from Stoke Newington in a fortnight.

A patient, having a fear of contagion from contact with people in buses, etc., which was causing much depression and danger of losing occupation, after one interview remained quite well, riding in public conveyances quite freely.

I could, if space permitted, give many examples of very many forms of fear thus overcome, as well as examples of blasphemous thoughts, of illusions of hearing, etc., and should be very pleased to try what I could do for the cases mentioned by Dr. Steen, if he would send them to me or allow me to see them.

It is of course necessary to keep at the case until you are quite sure that the patient is convinced, and it is necessary to know when this has been done; this requires much time at the first sitting. Cases of long standing, or of associated disease, or which are the prodromata of serious mental disorder, are in a different category. Simple uncomplicated forms of fear should not require so complicated and protracted a method of treatment as psycho-analysis or so questionable a procedure as the inducing of stupor.—I am, etc.,

Hampstead, Nov. 21st. HENRY RAYNER.

SIR,—It is evident that so long as the protagonists of the "New Psychology" decline to discuss it in terms of physiology and logic they cannot be compelled to do so. At most the weakness of their position can be demonstrated and emphasized.

I have no desire to be discourteous, but must confess that it is rather difficult for me to accept Dr. Steen's explanation in your issue of November 25th. It seems extraordinary to attempt to discuss a biological problem with the proviso that we are not to use physiological terms. Dr. Hart's "little book" is merely an epitome of psycho-analysis, and when reading it the passage which Dr. Steen quotes struck me as giving the whole position away, if indeed the author aims at anything approaching a scientific position. Dr. Steen and I evidently differ as to interpretation of language and accuracy of statement, and in order to show my reasons for this assertion I quote in parallel columns from his two letters to you:

Letter from Dr. Steen, BRITISH MEDICAL JOURNAL, *Nov. 4th.*	*Letter from Dr. Steen*, BRITISH MEDICAL JOURNAL, *Nov. 25th.*
"Asks how the intelligent student is 'to reconcile the theory of the unconscious with known physiology.' This same wonderful fellow, according to Dr. McBride, visualizes ideas as nerve cells and so on. No one will object to the vision if it does him or anyone else any good, but as he has no facts to support this figment of his imagination, he is theorizing in a demoralizing manner."	"I am bound to reply, as I have to enter the protest that I have been misrepresented. The offending passage is: 'He [Dr. Steen] apparently believes that thought can occur without physiological nerve and brain activity.' I can assure your readers that I believe nothing of the sort, and furthermore I did not say so. I do not accuse Dr. McBride of wilfully misquoting me, and I fancy I understand how he made the mistake."

Courtesy prevents my doing more than propounding to your readers the following questions: (1) What does your correspondent seem to believe and to have said? (2) Where is my mistake?

I hardly think that Dr. Steen's championship of psycho-analysis will have gone far towards establishing its claim to be scientific, and in this correspondence no one else has even attempted to do so. Perhaps your readers will draw their own conclusions. *Verbum sat sapienti.*—I am, etc.,

Harrogate, Nov. 25th. P. MCBRIDE.

INSULIN AND DIABETES.

SIR,—In his letter (November 18th, p. 997) Dr. Cammidge states that, since his experience has suggested that insufficiency of the internal secretion of the pancreas is the dominant factor in less than half the cases of glycosuria met with in England, one would expect that "insulin" would be useful in some such proportion of diabetics; it appears as if by this he would also incidentally mean that one would not expect that insulin may be useful in the rest of the cases. Even granting that Dr. Cammidge might be right in his opinion that pancreatic insufficiency is not the dominant factor in more than half the cases of glycosuria met with in England, I think that there is no strong reason why one may not expect that insulin, when properly administered, will be useful in any case of what is generally understood by "diabetes mellitus."

The published results of experiments[1] by the Toronto team of workers on insulin show that the injection of a certain amount of this product to normal animals is capable of lowering their normal blood sugar content, and even of preventing the hyperglycaemia that, without the previous injection of insulin, would be elicited by different experimental agencies, such as Bernard's puncture of the floor of the fourth ventricle, injection of adrenaline, inhalation of

[1] *Trans. Roy. Soc. Canada.* 1922. vol. xvi, Ser. V.

ether, etc.—that is, these experiments show that insulin is capable of causing a certain amount of sugar to disappear from the blood, or of preventing an increase of the existing blood sugar in cases in which neither the presence in the blood of the sugar that will be caused to disappear by insulin, nor the increase of blood sugar that would take place without the action of that product, have anything to do with an insufficiency of the pancreas.

Following the principles described by Collip to the extent allowed by the degree of correctness of my interpretation of them, and by the efficiency of the technical means at our disposal, small amounts of pancreatic extracts containing insulin were obtained at the Institut de Fisiologia de la Mancomunitat de Catalunya and its action was studied in one extremely severe case of human diabetes, in one experimentally diabetic dog, and in some normal dogs and rabbits. So far as the result of our experiments go, and in the light of some of the Toronto experiments suggesting that the sugar disposed of by the action of insulin is either stored as glycogen or katabolized by the tissues, producing an increase of the respiratory quotient, or both, one would say that it seems as if in all circumstances a given dose of insulin causes, within a certain period of time after its injection, a certain amount of blood sugar to be metabolized in some way or ways closely resembling, if not identical with, those of normal carbohydrate metabolism.

If we look at insulin as a pharmacological agent, possessing such a pharmacological action, and not as an extract of an organ that may have or may not have a causal relationship with a given pathological disturbance, it will be clear that we are justified in at least expecting as a possible thing that insulin may be useful in every case in which it may be desirable to lower the blood sugar content at a given moment, or to prevent its increase which would be produced by the ingestion of a given amount of certain foods, or to make a certain amount of carbohydrate, that would otherwise be wasted, follow the normal way of metabolism—that is, that insulin may be useful in every case of diabetes mellitus. It is clear enough that to *expect* is not the same thing as to foretell with assurance, and that to say that a remedy may be *useful* is not the same thing as saying that it will be almighty, nor even that its action is of a curative nature.

The fact that, as Dr. Macleod has said and is recalled by Dr. Cammidge, insulin will be chiefly of value in tiding patients over those crises which are frequently uncontrollable by other means, does not mean that, if sufficient amounts of the product are available, it cannot be also of great use in other cases, as an agent to be used in combination with a proper dietary regulation. I would point, as very important, to the possible employment of insulin for the preparation of previously untreated or insufficiently treated diabetic patients for peremptory surgical interventions; and, as very interesting, to the possibilities opened in the dietetic treatment of diabetes by the fact that we may have at hand a remedy the occasional employment of which may enable us safely to administer in a given moment a certain amount of carbohydrate in addition to that which would be spontaneously tolerated by the patient at that particular moment.

On the other hand it must be recognized that, whereas it can be expected that insulin will make the dietetic treatment of diabetes a lighter burden to the patient and a more pleasant task to the physician, it will not eliminate the necessity of dietary regulation, and, very likely, will not even make it an easier task.

Dr. Cammidge is no doubt right in claiming against excessive optimism, such as that of those who speak of a curative action of insulin; but I think that it is not quite out of place to claim also against excessive pessimism, and to insist upon what reasonably can be expected of this new discovery, which, as many of the epoch-making points in the history of diabetes, is due to the genius and the labour of English-speaking practitioners and men of science.—I am, etc.,

R. CARRASCO FORMIGUERA,
Assistant at the "Institut de Fisiologia de la Mancomunitat de Catalunya."

Barcelona, Catalonia, Nov. 27th.

SOME ARMCHAIR REFLECTIONS UPON INSULIN.

SIR,—The successful treatment of diabetes mellitus opens up new avenues for exploration. Some people are in the unfortunate position of being able to explore only one, but may gaze down others and say what they see. Some of the visions may be mirage.

The cost of insulin as prepared at present will prove prohibitive if made in London, unless wealthy diabetics are prepared to pay for the needy. How can insulin be reduced in cost? At present a dose needs half a pancreas of an ox and about three quarts of alcohol. It is true that much of the alcohol can be regained.

1. Insulin must be prepared in places where alcohol is very cheap and the pancreases of oxen do not demand high prices. I am told that in Durban alcohol is ninepence a gallon, whilst the pancreas of an ox can be bought for less than a shilling.
2. Improvement in the methods of extraction: (*a*) to extract more insulin from the raw material; (*b*) to reduce the cost of the extracting substances.

Before attempting to extract more insulin from the pancreases of oxen it would be wise to be certain that the yield by the patented method of extraction is not more than 80 per cent. of that present.

Some idea might be formed of the quantity of insulin made by the pancreas of an ox by estimating its blood sugar and then injecting intravenously a solution of dextrose in sufficient quantity to raise its blood sugar to half as much again and noting the rate of fall of the percentage of sugar in its blood. It is true that this method might lead to a conclusion that there was more available than it was possible to extract, because it seems likely that dextrose is the activator of the cells of the islands of Langerhans. No doubt experiments are being conducted to determine whether a better yield of insulin is obtainable from the pancreas of fasting or recently fed animals. Deducing from observations upon diabetics one would expect the best yield from an animal which had been fasted at least twenty-four hours, then fed with carbohydrate, and slain one hour later. If a recently fed animal proves to give a greater yield it will be necessary to attempt to estimate the increase, and determine whether that increase would compensate for the cost of the food.

One would not anticipate a large production by the pancreas of an ox, because oxen feed on grass, and therefore must obtain a very large percentage of their energy from cellulose. Cellulose is converted into an absorbable carbohydrate comparatively slowly, and therefore absorption is very prolonged. For this reason no large quantity of insulin is required at any moment. The pig which eats roots and nuts is more likely to possess a pancreas rich in insulin.

The fact that insulin prepared from an ox will act in man and dog makes it unlikely that it is essential for the action of the cells of the animal, but that it is a ferment which has as its function an action upon dextrose: it changes dextrose so that it can be stored or burnt. This leads one to hope that some other ferment much more easily prepared may be found to possess a similar property. Preparations are being made to test the zymase group in the laboratories of the London Hospital Medical College.—I am, etc.,

Portland Place, W.1, Nov. 27th. O. LEYTON.

PERSISTENT EOSINOPHILIA WITH SPLENOMEGALY.

SIR,—I have been very much interested in the case published under the above title by Drs. Stuart McDonald and A. F. Bernard Shaw (November 18th, p. 966). With many other haematologists, I hope they will accept my compliments and thanks. They discuss certain comparable cases in the literature, but not all, and that is my reason for adverting to the subject. May I direct the attention of those interested to the case recorded in the *Lancet* of September 15th, 1894 (p. 627)?

The patient was a woman, aged 30. On December 25th, 1893, she was suddenly seized with acute abdominal pain. On January 2nd, 1894, an enlarged rotated spleen was removed. Her blood was examined two days later and the leucocytes found to be 10,000 per c.mm. From this date on until May 23rd, when she left hospital, the white cells continually increased. On the latter date they were 50,000 per c.mm. In a private communication the late Sir Edward Malins, who published the case, informed me that he last heard of her seven years after the operation and that she was then in good health.

In those days blood examinations were less detailed than they now are, but it is stated that there was nothing special to be noted about the white cells, other than their number, except on one occasion. On this occasion (more than three months after operation) "the most remarkable point was the presence in the blood of fairly considerable numbers of large white nucleated corpuscles, varying in diameter from 30 to 50 μ, in which were contained several red cells, in some twenty or more."

It was the remarkable avidity of the eosinophiles in the recently reported case which recalled the case of Malins to my mind. Although it may be more nearly related to that of Tuohy, it is at least a case of splenomegaly with leucocytosis

which presents analogies to those already mentioned, and to the cases of Stillman, Giffen, and Aubertin and Giroux. Moreover the case of Malins leads naturally to the mention of two other remarkable cases of splenomegaly and leucocytosis.

The first of these is that of van Nuys. The patient was an adult suffering from aortic regurgitation and massive splenomegaly. The leucocytes reached 100,000, but during an attack of erysipelas fell almost to normal. In this case the peculiar cells noted by Malins were a constant finding, but they did not usually ingest red cells, apparently preferring leucocytes.

The second case is that of Bartlett, later reported very fully by Rowley. It was again the case of an adult male with heart failure and splenomegaly. The white cells reached 700,000, and not only were the cells described by Malins present, but all the white cells became at a later stage phagocytic for red cells and for each other. Moreover the diluted blood injected subcutaneously into a guinea-pig caused its white cells to go mad and eat each other, but the effect was not lasting and the animal recovered.

I have always regarded this as one of the most remarkable cases ever recorded, almost too strange for belief, but the authority of Malins and Mary Rowley is undoubted, nor can one question that of van Nuys or Bartlett. Those who will be so good as to refer to the *Proceedings* of the Royal Society of Medicine, 1919 (Medical Section), xiii, pp. 1-21, will see that the analogies may be further expanded until one meets with the cases of Herrick, Washburn, Cooke, and Meyer, in which the spleen is not enlarged, and there are other interesting and characteristic features, but there is a constant leucocytosis with 5 to 7 per cent. eosinophiles.

It may perhaps appear that we have travelled far from the case of McDonald and Shaw, but yet there is undeniably a series of connecting links which suggest that an explanation of the essential pathology of these cases is to be found in the direction of the acholuric jaundice group rather than in that of leukaemia. It would be extremely interesting to know whether the plasma of McDonald and Shaw's case would produce any effect when injected into the blood of a guinea-pig. One feels that the eosinophiles in that case are doing their best to meet some demand. The fact that they are, *inter alia*, devouring red cells (a most improper activity for the eosinophile) suggests that their potentialities are increased rather than diminished as is usual in the indifferently finished cells of leukaemia. The further fact that in Herrick's case the red cells were (1) abnormal owing to a plasma defect which rendered even the cells of other persons similarly abnormal, (2) occasionally undergoing phagocytosis in the peripheral circulation, and (3) associated with a leucocytosis in which eosinophiles had a prominent part, would possibly suggest that further investigation of the serum in McDonald and Shaw's case might be well worth undertaking.

On the other hand, we must admit that if these cases are regarded as leukaemic in nature the literature again provides certain intermediate cases, or cases which might be considered intermediate. There is, for instance, the case of Simon, in which a fractured tibia that had become septic was associated with splenomegaly, 50,000 leucocytes, and 17 per cent. of mast cells. There is also a suggestive case reported by Coles in which eosinophiles very largely dominated the blood picture in a case which progressed to a typical myeloid leukaemia. But, generally speaking, the cases which might connect those of Giffen, Tuohy, etc., with leukaemia are of an acute transient character and are characterized by their symptomatic nature, while those which connect (at the end of the line) with haemolytic jaundice have far more the appearance of clinical entities. It is a peculiar fact that so many of them have been complicated with heart failure when first seen.

Should Drs. McDonald and Shaw care to follow out the train of thought I have suggested, I shall be glad to lend them (under bond and heavy penalties if not returned) copies of most of the papers herein mentioned. This will save them much wearisome search of the literature.—I am, etc.,

Sevenoaks, Nov. 28th. GORDON WARD.

P.S.—References will be found in the paper in the *Proceedings* of the Royal Society of Medicine referred to above.

NON-MALIGNANT AFFECTIONS OF THE COLON (INTESTINAL STASIS).

SIR,—Is it not surprising that in the year of grace 1922 the colon should still be considered as maintained in position much in the same way as a pair of "shorts" pegged to a clothes-line, and that it should be supposed that its contents have to be pushed up one limb against gravity, presumably falling down the other by their weight? Such is the impression I get from the report on the discussion on the above subject in your issue of November 25th. Thus, Sir Henry Gray states that the right and left borders of the omentum "tack" the hepatic and splenic flexures "to the abdominal wall or adjacent viscera." And Mr. Waugh says: "The exposure of the alimentary tract to the influence of gravity as the result of man's upright position has imposed upon it a strain unique in the animal world."

But is this tenable? I wonder how often the distinguished surgeons who participated in the above discussion have incised the abdominal wall outside the rectus in well-developed individuals, and how often they have noticed the thickness of the flank muscles in such individuals. I venture to ask them, What interpretation is to be put on the presence of these massive muscular sheets? Are the transversales abdominis—which collectively would be better called the *constrictor transversus abdominis*—with the individual in the erect posture, doing nothing? And is the thoracic diaphragm, a veritable *epigastric depressor* simply of respiratory significance?

Transverse sections through the trunk in the frozen dead reveal the abdominal cavity all packed closely with viscera and visceral parts. In the living healthy individual, in virtue of the tonic and other contractions of the constrictor transversus abdominis and other muscles, these viscera are maintained closely pressed against each other even in the erect posture, in which, indeed (for circulatory reasons), the compression is greater than in the dorsal decubitus. The ascending colon is thus supported by the pressure of surrounding parts, and the hepatic and splenic flexures squeezed high into the lateral epigastric recesses. The compression resulting from the muscular walls of the container, in which is located the visceral mass, puts gravity out of court. During evolution, with the production of an equilibrium, the strain resulting from the erect posture is thus not on the gut, but on the walls of the container (the abdomino-pelvic cavity). Comparative anatomy shows how these musculatures have developed step by step with the increasing activity of the vertebrate, the most pronounced changes being found with the transition from the pronograde to the orthograde form. So also we see that when the well-developed adult stands up the lower abdomen does not pouch.

Intestinal stasis seems to me so buttressed up with unanatomical, unphysiological, and unpathological reasonings that it is not easy to discuss. What will happen to it when these props are removed I do not know. That the whole structure of man is not considered I have shown. That unphysiological reasoning abounds seems to me indicated by the picture of the greatly elongated pelvic colon "puddling" in the pelvis, with many angles, offering "a great obstacle to the passage of solid material through it, since the more the individual strains to expel the bowel contents the farther is the flaccid gut driven into the lower limit of the pelvis" (Lane). Has the distinguished author forgotten that defaecation depends on peristalsis (which can smooth out angles even in the abnormal), and that in the absence of peristalsis, in health, faecal masses can only be expelled if located in the ampulla of the rectum, and even then only with the greatest difficulty?

That an unpathological element is present seems to me evident from the suggestion that morbid processes occurring in the colon arise irrespective of vital processes elsewhere. The relation of the visceral activity (which includes that of the excretory organs) to the tonic and other contractions of the musculatures enclosing the visceral mass and the rise of abnormal intestinal processes and the effect they have (directly or indirectly) on the enclosing musculatures are all unconsidered. But these perhaps are extremely important.

In the absence of definite intestinal obstruction, caused by organic kinks (due to adhesions), narrowing of the lumen (strictures), foreign bodies (intestinal gall stones), and of ulcers, etc., the yielding of the abdominal wall, as evidenced by its flaccidity palpable in the dorsal decubitus, and by a marked bulging of the lower abdomen when the individual stands, dominates, in my opinion, the pathological process. How such can be remedied by partial colectomy, colonic exclusion, or the other numerous procedures mentioned, seems to me inexplicable. I have seen only one patient who suffered a partial colectomy; and her opinion was that she wished she were dead.—I am, etc.,

R. H. PARAMORE, F.R.C.S.Eng.

London, W., Nov. 26th.

RED FATIGUE.

SIR,—Recently I read your editorial (of September 10th, 1921, p. 413) concerning Dr. Edridge-Green's important experiment on the white equation or the amount of pure spectral red, green, and violet required to match simple white. He finds that after red fatigue of 5 seconds only about half as much green is then required. If a myoid or muscular nature is assigned to the rods and cones his results are explained as due to residual tetanus or tone, an after-image effect of slight fatigue. The tone for red is prolonged and co-operates with the green to balance the violet and give the tone for white. To my mind it is ridiculous to regard the rods and cones as nerve elements; for their constant lengthening and shortening—or contracting and relaxing—would be grotesque and unheard-of behaviour on the part of nerve cells, though quite proper for muscle cells. With longer red fatigue the after-image would be complementary and this explains his other results. These solutions depend upon the myoid theory of vision formulated by me in 1919 in *Mental Biology*, Part IV (and published by F. W. Talbot, Cambridge). Dr. Edridge-Green rightly taxes the theories of Young, Hering, etc., for failing to explain his results.—I am, etc.,

Kandavu, Fiji, Aug. 30th. WALTER M. COLEMAN.

CANCER OF THE SCROTUM.

SIR,—I read with interest the observations of Dr. Archibald Leitch (November 25th, p. 1047), with regard to the production of malignant disease in mice, by means of crude mineral oil products. I noted clinically the association of the disease with mule-spinners as far back as 1906–7, whilst house-surgeon for the late Mr. G. A. Wright. It may interest Dr. Leitch to know that some of our sections showed very little chronic inflammatory change, but marked proliferative changes in the deeper layers of the epithelium, suggestive of the action of some auxetic substance.

As regards the frequency of the disease, it would appear to be relatively common in South Lancashire, for since publication I have had communications from surgeons in other South Lancashire towns confirming the observations. It appears, however, to be a very rare disease in chimney-sweeps in this district.—I am, etc.,

Manchester, Nov. 27th. S. R. WILSON.

LILLIPUTIAN HALLUCINATIONS.

SIR,—I was interested in Dr. F. M. Rowland's letter (November 18th, p. 999) on Lilliputian hallucinations, for quite recently this rarely described syndrome came under my notice during the early stages of a severe case of scarlet fever.

The patient was a young adult. On the second day of the fever he became delirious and continued so for four days. Prominent amongst the mental symptoms were hallucinations of the type described by your correspondent. The patient pictured vivid scenes, in which hosts of small people—men, women, and children in gaily coloured clothing—were the chief actors. Their many and varied activities appeared to be vastly entertaining. The most up-to-date mechanical appliances (all proportionally small in size) were used in their multiple undertakings. They worked noiselessly and were never heard to speak. Animals did not figure in the pictures. These hallucinations did not excite fear in the patient. For the most part he seemed interested and amused, always preserving a normal conception of persons and surrounding objects.

Occasionally giant types were described.

The patient made a good recovery and still retains pleasant memories of his sojourn amongst the Little People.—I am, etc.,

Caxton, near Cambridge, Nov. 20th. J. C. HALL.

*** Dr. J. W. Duncan (Hockley, Birmingham) sends us a note in which he mentions the case of a lady over 70 years of age, who recently complained to him of feeling giddy and of seeing little stars, like fire, all moving about.

DYSTOCIA DUE TO GIGANTIC FOETUS.

SIR,—The case of gigantic foetus reported by Dr. E. L. Moss on October 7th, 1922 (p. 643), is interesting, not only because of its rarity and the difficulty of diagnosis and treatment, but as a case helpful in throwing some light on the etiology of this condition generally, and also on the causation of "progressive enlargement of foetus."

As general physiological growth of the body is stimulated by a hormone from the pituitary, and pathological overgrowth, such as gigantism and acromegaly, is due to an *excess* of this endocrine, it seems reasonable to assume that in the foetus also both conditions—growth and overgrowth—are likewise brought about by analogous causes—namely, in the former by normal, and in the latter by an excessive, amount of pituitary hormone in the *mother*.

In support of this view let me quote from among others the case of Mrs. L., reported by me in the *South Africa Medical Record* (April 8th, 1922). I have attended her with babies weighing 12, 14, and 16½ lb. respectively; in her last pregnancy she developed the typical appearance of acromegaly, with glycosuria; the latter condition persisted.

In Dr. Moss's case we have also similar evidence of hypopituitarism: (1) in the marked overgrowth of the foetus; (2) in the greater degree of ossification of the bones (due to pituitary Ca retention); (3) in the manifestations of pre-eclamptic symptoms; of high blood pressure (160 mm. Hg), renal disturbance, and in the finding of traces of acetone and diacetic acid, all of which can be traced to hyperpituitarism (Kark, "Eclampsia: Evolution as a causative factor," BRITISH MEDICAL JOURNAL, June 10th, 1922).—I am, etc.,

Cape Town. S. E. KARK, M.B., Ch.B.

THE SMALL-POX OUTBREAK AT POPLAR.

SIR,—My letter in your issue of November 25th was an invitation to Dr. Killick Millard to come out into the open. His attitude, however, is still not quite explicit. His letter in your issue of December 2nd (p. 1097) is an ingenious attempt to run with the hare of vaccination and to hunt with the hounds of Leicester and the Anti-Vaccination League. While admitting that small-pox can be effectually prevented by vaccination, he implicitly condemns the latter because it "masks" small-pox by modifying it. He appears to regard with complacency the possible epidemic prevalence of mild small-pox (among the unvaccinated) because it "tends to" breed true and does not give rise to a virulent form of the disease. It may be admitted that there have been outbreaks of small-pox in which most of the cases were mild (as in the United States a few years ago), but it by no means follows that naturally mild cases are not dangerous. The idea that mild small-pox can be relied on to breed true is opposed to analogy in other diseases and contrary to experience in small-pox. I have only a small experience of the disease—limited to two outbreaks in Reading during the last thirty years, in both of which I saw nearly every case, but, though there were few deaths, there was every gradation of type from the mildest to the most severe form, and neither the mild nor the severe cases were all in vaccinated persons.

Another point of Dr. Millard's is the old antivaccinist wheeze that "most of the deaths are in vaccinated persons." I fear this fact, when it is a fact, may be, at least partly, the fault of certain black sheep in the profession who, for a consideration, have vaccinated inefficiently. I once knew a medical man who built up a large practice (of a kind) by vaccinating in one small spot only and then signing a certificate of "successful vaccination." (This was, of course, before "conscientious" objection provided such an easy and convenient means of escape.) Another medical man once told me that he vaccinated just as much or as little as people asked for, apparently regarding the question as simply a matter of supply and demand like the sale of potatoes.

I agree with Dr. Millard that saturation of the population with vaccination is probably unattainable in this country. If the people prefer small-pox to vaccination they must have it, but we of the medical profession need not back them up in their preference. On the contrary, I would proclaim constantly that no individual need have small-pox *at all* unless he or she wishes it, however much the epidemic may rage in others, and that *every* death from small-pox is a case of either suicide or murder, and should be stigmatized as such.—I am, etc.,

Reading, Dec. 4th. F. W. STANSFIELD.

OUTBREAK OF SMALL-POX IN POPLAR WORKHOUSE.

A Correction.

SIR,—In the concluding paragraph of my letter appearing in your issue for December 2nd I stated, "It is interesting to learn that all of the 22 fatal cases in the present outbreak had been vaccinated, presumably in infancy." I mentioned this on the strength of a statement appearing in the daily press. I now learn that the statement is incorrect. I understand

that several of the cases (I do not know how many) were unvaccinated, and I hasten to express my regret that I had not first verified the statement. Fortunately, the statement was quite immaterial to my main argument, which was the danger arising from unrecognized cases in once vaccinated persons.—I am, etc.,

Le cester, Dec. 4th. C. KILLICK MILLARD.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

AT a congregation held on December 2nd approval was given for the appointment of a University Lecturer in Embryology for a period not exceeding five years, with an annual stipend of £250, one of the lecturer's duties being to give instruction in the embryology of the vertebrata.

The following medical degrees were conferred:

M.D. (by incorporation).—H. R. Dean, D.M.Oxon., Professor of Pathology.
M.D.—C. C. Kerby.
M.B., B.CH.—E. M. Burrell, E. A. Fiddian.

The number of medical students pursuing their studies this term in the University is 476. This total is made up as follows: Freshmen, 145; second year, 143; third year, 131; medical students of higher years in residence, 57.

UNIVERSITY OF LONDON.

A MEETING of the Senate was held on November 15th.

Mr. G. T. Mullally, M.S., was recognized as a teacher of surgery at Westminster Hospital Medical School.

The annual report of the Graham Legacy Committee, which was presented to the Senate, gave particulars of the general progress of the laboratory, the researches which had been carried out, and the amount of the grants made to workers. The Committee also reported the gift by Dr. Charles Bolton, F.R.S., of £100, being a moiety of the Mickle Fellowship awarded to him by the University in 1921. Professor A. E. Boycott, F.R.S., was reappointed director of the laboratory for one year from January 1st, 1923.

The resolution regarding the issue of certificates for examination in the Faculty of Medicine for internal students passed by the Senate on October 20th, 1920, was rescinded, and it was resolved that the regulations for internal students in the Faculty of Medicine be amended so as to provide that certificates of having passed the first and second examinations for medical degrees be issued to all students qualified to receive such certi cates.

Dr. E. Graham Little and Sir Wilmot Herringham, K.C.M.G., C.B., have been appointed chairmen for 1922-23 of the Council for External Students and of the Graham Legacy Committee respectively.

Applications for the University Chair of Anatomy tenable at St. Bartholomew's Hospital Medical College, salary £1,000, must be received by the Academic Registrar at the University not later than the first post on April 16th, 1923, from whom further particulars may be obtained.

The William Julius Mickle Fellowship for 1923 has been awarded to Mr. F. James Fitzmaurice Barrington in respect of the work carried out during the past five years on the nervous mechanism of micturition.

Applications for the Graham Scholarship in Pathology of the value of £300 per annum for two years must be received by the Principal Officer at the University not later than the first post on Monday, January 1st, 1923. The scholarship was founded under the will of the late Dr. Charles Graham to enable "a young man to continue his pathological researches and at the same time to secure his services to the School of Advanced Medical Studies connected with University College Hospital as a teacher under the direction of the Professor of Pathology." It is in no way restricted to students either of University College Hospital Medical School or any other medical school of the University of London.

UNIVERSITY OF EDINBURGH.

THE following candidates have been approved at the examination indicated:

FINAL M.B., CH.B.—M. S. Abaza, S. C. Alcock, Isabella H. Allan, W. Anderson, Jean Y. Andrew, Margaret S. R. Armstrong, M. P. Atkinson, C. J. Austin, L. C. L. Averill, P. J. Badenhorst, J. B. S. Baxter, Lilias F. E. Begg, Margaret I. Bower, J. Brown, Eleanor M. Cadman, A. H. Campbell, J. M'P. Campbell, Mary J. Cheng, *D. S. Cherry, Irene V. E. Christison, J. J. Coulthard, R. T. Deas, K. S. Dick, *J. L. N. Dinwiddie, Grace M. F. Dover, Grace W. W. Eason, E. C. Ellis, D. L. Ferguson, N. Fram, J. Glover, R. T. F. Grace, Annie C. S. Haddow, H. R. Haigh, Margaret M. R. Hamilton, H. Hastings, H. D. Hayes, Flora M. Hogg, C. F. W. Illingworth, A. K. James, L. B. Jones, Margaret W. Kemp, G. G. King, B. Leader, R. C. Little, Elizabeth T. Logan, D. B. M'C. Lothian, D. T. M'Ainsh, I. H. M'Clure, F. N. M'Farlane, Annabella M'Garrity, J. C. Macgown, Elizabeth M. Mackay, A. W. Mackie, W. M'Kie, Marjorie C. Mackintosh, I. F. Macleod, R. A. C. Macnair, J. M. Manson, Grace J. Marshall, K. A. T. Martin, F. G. J. Mulder, C. L. L. Murray, S. Petkoon, Joha na V. Pietersen, Elsie Porter, Jean S. Riach, T. Ritchie, S. J. Rom, Isabel S. Rutherford, R. M'G. Saunders, Annie B. A. Scott, R. Selby, D. Slight, Flora M. Stewart, D. Summerville, B. G. Thompson, Charlotte E. W. Thompson, Elizabeth N. Thompson, H. V. Thwaites, J. Todd, Isabella du Toit, H. R. Vernon, H. L. Wallace, R. W. R. Watson, Hazel H. F. Watt, J. Williams, Margaret S. Williamson, R. P. Wilson, M. Witkin, W. S. Woodburn.

* With distinction.

SOCIETY OF APOTHECARIES OF LONDON.

THE following candidates have passed in:

SURGERY.—E. Downing, A. Gullertein, *H. D. L. Jones, W. A. Jones, M. Newfield, G. Shwartzman, A. W. L. Smith.
MEDICINE.—E. Downing, J. Mitchell, M. Newfield, R. F. A. Philpott, A. W. L. Smith.
FORENSIC MEDICINE.—E. M. Chidson, E. Downing, D. J. Dubash, M. Newfield, R. F. A. Philpott, P. D. Richards, A. W. L. Smith.
MIDWIFERY.—E. M. Chidson, E. Downing, A. Gullertein, R. F. A. Philpott, P. D. Richards, A. W. L. Smith.

* Section II.

The Diploma of the Society was granted to Messrs. E. Downing, H. D. L. Jones, W. A. Jones, J. Mitchell, M. Newfield, and A. W. L. Smith.

The Services.

WAR EMERGENCY FUND.

AT the last meeting of the War Emergency Fund Committee 29 cases were considered. The sum of £573 was granted for personal service and £563 6s. for education. It was reported that two cases had not reapplied for renewal of the education grant. Under the education scheme the committee agreed in two cases to sanction the change of schools. The War Emergency Fund is now educating 47 sons and daughters of medical men at a cost of £3,420 per annum.

DEATHS IN THE SERVICES.

Surgeon General Sir Francis Wollaston Trevor, K.C.S.I., C.B., Army Medical Staff (retired), died at his residence, Oerley Hall, Shropshire, on November 16th, aged 70. He was the son of the late E. S. R. Trevor, of Trowscoed, Welshpool, and was educated at Guy's Hospital and at Aberdeen University, where he graduated M.B. and C.M. in 1874; he took the M.R.C.S. in the same year. He entered the army as surgeon on September 30th, 1874, attained the rank of colonel on January 14th, 1903, and that of surgeon general on June 29th, 1906. He retired on January 1st, 1912. He served in the Afghan war in 1878-80, in the Kandahar Field Force, at the action of Ahmad Khel, and in Roberts's march from Kabul to Kandahar, the relief of Kandahar, and battle of Kandahar on September 1st, receiving the medal with two clasps, and the Kabul-Kandahar bronze star; in the Sudan campaign of 1884-85, with the Nile column, medal with clasp, and Khedive's bronze star; and in the South African war in 1901-2, as P.M.O. of a division, operations in the Transvaal, Orange River Colony, Zululand, and Cape Colony, mentioned in dispatches in the *London Gazette* of July 29th, 1902, Queen's medal with five clasps. From 1908 to 1911 he was Director of Medical Services in India. He received the C.B. in 1907, the K.C.S.I. in 1911, and in 1910 was appointed Honorary Surgeon to the King. He married Mary Mytton, daughter of R. H. Mytton of Garth, Welshpool, and leaves two sons and one daughter. Colonel H. O. Trevor, Army Medical Staff (retired), is his younger brother.

Lieut.-Colonel Terence Humphrys Sweeney, C.M.G., Bengal Medical Service (retired), died suddenly at Cheltenham on November 15th. He was born on July 15th, 1856, at Castlerea, Roscommon, and educated at St. Vincent's Hospital, Dublin, taking the L.R.C.S.I. in 1877, the L.K.Q.C.P. in 1878, and the F.R.C.S.I. in 1879. Entering the I.M.S. as surgeon on September 30th, 1878, passing first into the service, he became lieutenant-colonel after twenty years' service, and retired, with an extra compensation pension, on March 1st, 1909. Most of his service was passed in civil employ in the North-West, now the United, Provinces, where he was appointed civil surgeon of Mirzapur in 1886, and of the important city and district of Benares in 1890. He served in the Afghan war of 1878-80, taking part in the operations at and round Kabul, and in the defence of Sherpur, and received the medal with a clasp. He rejoined for service in the recent war, and was in command of York Place Indian Hospital, Brighton, from its opening on December 1st, 1914, to its closing on December 31st, 1915, for which he received the C.M.G. on June 4th, 1917. His wife died shortly before he retired from the service. He leaves one son—a lieutenant in the Royal Engineers—and two daughters.

Brigade Surgeon Lieutenant-Colonel George Gilbert MacLaren, Bengal Medical Service (retired), died at Blairgowrie, Perthshire, on November 17th, aged 77. He was the son of the late John MacLaren, of Dalnalreck, Kirkmichael, Perthshire, and educated at Edinburgh, where he graduated M.B. and C.M. in 1866. He entered the I.M.S. as assistant surgeon on April 1st, 1868, became brevet lieutenant-colonel on May 1st, 1893, and retired on June 27th, 1893. Almost the whole of his service was spent in civil employ in the North-West, now the United, Provinces, and most of it in the station of Dehra Dun, in the lower Himalayas. He founded the MacLaren Leper Asylum in that station.

Major Arthur Cameron Duffey, R.A.M.C., died of pneumonia in London on November 12th, aged 47. He was educated at Trinity College, Dublin, where he graduated B.A. in 1894, M.B., B.Ch., and B.A.O. in 1896, and M.D. in 1897, in which year he took the L.R.C.P. also. After filling the post of medical officer of the City of Dublin Hospital for two years, he went out to the South African war as a civil surgeon, subsequently entering the R.A.M.C. as lieutenant from November 29th, 1900. He became major on August 29th, 1912, and was placed on half-pay on November 10th, 1920. He served in the South African war, in operations in Cape Colony and in the Transvaal, receiving the Queen's medal with four clasps. In 1899 he went to the United States as special commissioner of the Cancer Society, and was the author of a work, *Conditions and Treatment of Cancer in the United States.*

Obituary.

SIR NORMAN MOORE, BT., M.D., LL.D.,

Late President of the Royal College of Physicians of London; Consulting Physician to St. Bartholomew's Hospital.

[*With Portrait on Special Plate.*]

BY the death of Sir Norman Moore, which occurred on November 30th at his house, Hancox, near Battle, the medical profession has lost a distinguished physician and one of its brightest ornaments. Born in 1847 at Higher Broughton, in Lancashire, he was the only son of Robert Ross Rowan Moore, a graduate of Trinity College, Dublin, and a barrister by profession. Robert Moore was descended from an Ulster family, and he contributed in no small degree to the success of the anti-Corn Law agitation by his ability as a public speaker, and his earnestness in the cause he was advocating. He toured the country in co-operation with Bright, Cobden, and Fox, and a share of the success of that movement was certainly due to his power of lucid exposition.

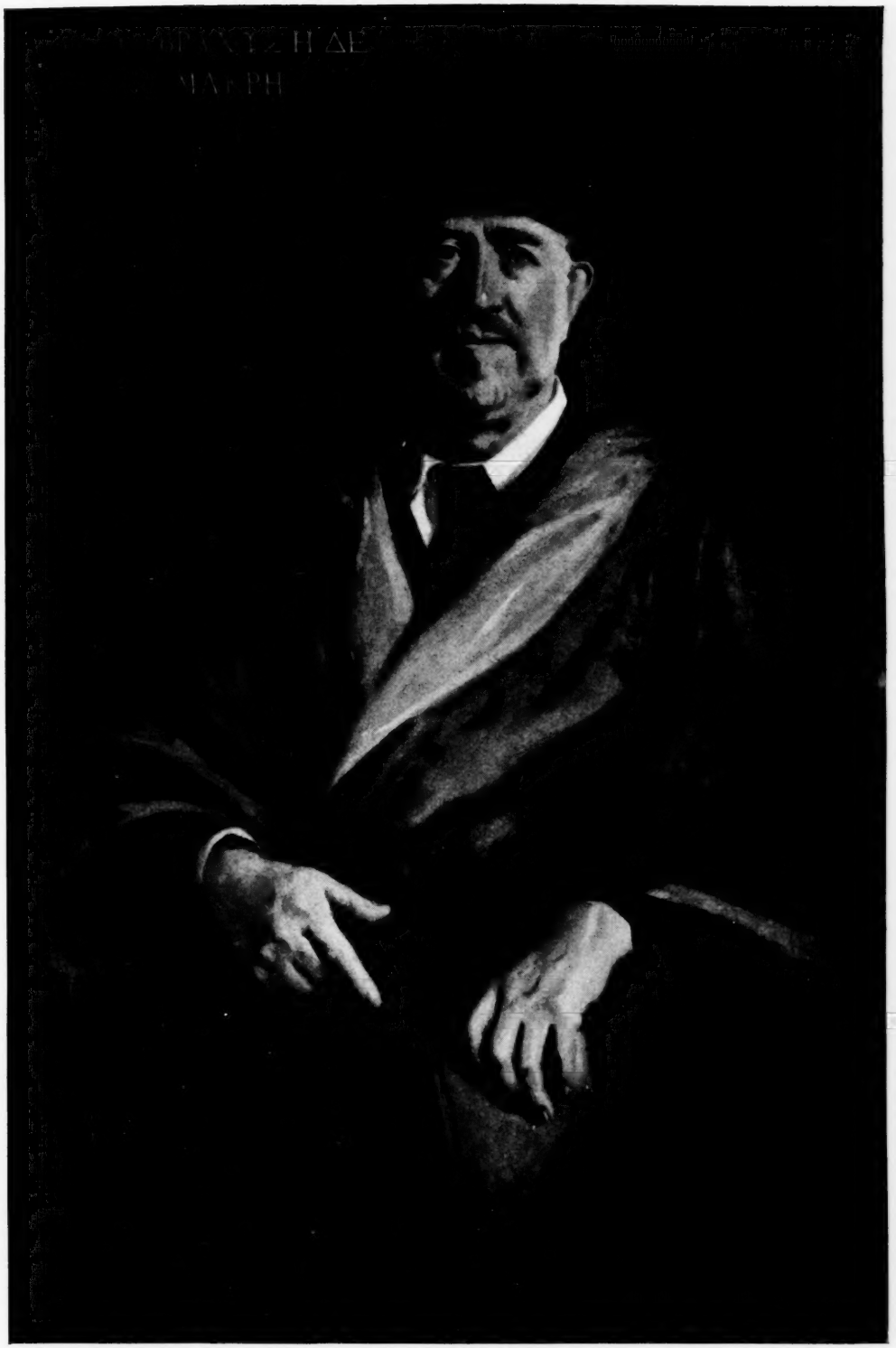
Norman Moore began his education by entering Owens College in 1863, and while there he showed considerable aptitude in the subjects of history and biography. From Owens College he proceeded to St. Catherine's College, Cambridge, and in 1868 obtained the second place in the second class of the Natural Science Tripos. The following year he took the degree of B.A., in 1872 the degrees of M.A. and M.B., and four years later he graduated M.D. While at Cambridge, although engaged in the study of medicine and science, his interest lay chiefly in the direction of literature, and much of his spare time was spent in association with men engaged in the study of the arts rather than with those engaged in acquiring a knowledge of science. Indeed, apart from a keen interest in natural history and comparative anatomy, it cannot be said that he evinced any deep regard for natural science. It was at Cambridge that he laid the foundation of that wide acquaintance with literature on which his lasting fame will rest. Among others he was brought into contact at Cambridge with Henry Bradshaw the famous University Librarian, and this acquaintance was largely responsible for the deep knowledge shown by Moore in mediaeval history. Through the influence of Bradshaw he became interested in the study of palaeography, a subject in which he acquired great skill.

On leaving Cambridge Norman Moore proceeded to St. Bartholomew's Hospital in order to finish his medical curriculum, and with this hospital his name was closely identified for the remainder of his life. After taking the M.B. in 1872 he filled successively the posts of house-physician from 1872 to 1874; casualty physician from 1875 to 1877; assistant-physician from 1883 to 1902, and physician from 1902 to 1911. For a period of eleven years, from 1874 to 1885, he was a lecturer on comparative anatomy to the hospital, and he occupied the post of warden for no less than seventeen years. Throughout the whole of the period, extending over thirty-seven years, that Norman Moore was connected with St. Bartholomew's Hospital, he was devoted to its welfare. His activities were incessant, and whether he was teaching in the wards, or engaged in committee work connected with the school, he was always alert and ready with suggestions, conveyed often with humour, and always with clearness and precision. He had great moral courage, and was fearless of the opinions of others. For many years he was responsible for teaching pathology at the hospital, and in this subject he took a great interest. Later in his career he was appointed Lecturer on Medicine, a post he held from 1893 to 1911. Here his ability as a ready and fluent speaker made his lectures popular. His method of teaching was based upon the principle of insisting on cardinal facts, and these were illustrated with many apt references drawn from his vast store of knowledge obtained from books. The result of his medical work in connexion with his long association with St. Bartholomew's Hospital found expression in many published works, of which the following may be regarded as representative. His first medical work was *Observations on the Shape of the Chest in Cases of Hypertrophy of the Heart*, published in 1873. This was followed by *Observations on the Morbid Anatomy of Gout* in 1887; The Distribution and Duration of Visceral New Growths, which formed the subject of the Bradshaw lecture delivered in 1889; *Pathological Anatomy of Diseases*, 1889; *Principles and Practice of Medicine*, 1893; *Pleurisy: Its Pathology and Treatment*, 1905; and as the subject of the Lumleian lecture in 1909 he chose Rheumatic Fever and Valvular Disease. Besides these works he contributed many papers to the St. Bartholomew's Hospital *Journal* and other medical journals. Clear and easy exposition was the main feature of his medical writings, and they all bore the stamp of great literary skill. He was also an active member of the various medical societies, and took especial interest in the work of the Pathological Society.

It might be supposed that the narration given above of the medical activities of Norman Moore would account for the whole of his busy professional life, but that is far from being the case. Throughout his life he was devoted to the interests of St. Bartholomew's Hospital, but that devotion was in equal measure shared by the College of Physicians, for which he had a deep and abiding love; in its service were spent his happiest hours. Here he was in an atmosphere congenial to his spirit, surrounded by the books and manuscripts he loved and knew so well, gazing on the portraits of the great physicians whose biographies he had written with such skill, and taking his seat at the Comitia where Freind, Mead, and Sloane—his ideals of the cultured physician—had sat: here he was truly in his element. The work he accomplished for the College must ever remain as the brightest memorial of his active and valuable service. He saw in the College an ancient institution containing so much of value in its composition that it had been able to survive the wreck of time. With his veneration for antiquity he applied himself wholeheartedly to the task of preserving and perpetuating the sound principles on which the College is founded, and he watched with unremitting care lest innovations, introduced in conformity with modern requirements, should weaken the main structures of the foundation. But he was no reactionary; he was merely conservative, and when once he was persuaded that a change was for the good of the College he adopted it without reserve or qualification.

He was admitted a Member of the College in 1873, and four years later was elected a Fellow. From that time he was a constant attendant at all the meetings, and held at various times all the offices connected with the College with the exceptions of Treasurer and Registrar. He was a member of the Council from 1896 to 1898; censor in 1904 and 1905, and senior censor in 1908. In 1910 he was elected Harveian librarian in the place of Dr. Payne, and this post he held until 1918. From 1901 to November of the present year he was the representative of the College on the General Medical Council, and in that capacity supported with great energy the claims of the College. He gave the Bradshaw lecture in 1889, the Harveian oration in 1901, the FitzPatrick lectures in 1905 and 1906, and the Lumleian lectures in 1909. In 1918 he was elected President, a fitting honour to one who had served the College so well, and this office he held until the present year with great ability and distinction. When the annual meeting of the British Medical Association was held at Cambridge in 1920 the portrait painted by Sir William Orpen was presented to Sir Clifford Allbutt by Sir Norman Moore on behalf of the subscribers. At that time he received from the University of Cambridge the honorary degree of LL.D.

Hitherto we have dealt with the career of Norman Moore as a physician engaged in the active practice of his profession. We have now to give an account of him as a man of letters. It is true that he occupied a distinguished position as a physician, but it is probable that his fame will rest on the literary work he accomplished. From his youngest days he was gifted with a love of books and a keen literary sense. His heart was always in his study, and the amount of knowledge he absorbed from reading was truly marvellous. He had a most retentive memory and the capacity for detecting with celerity the salient parts of a book. Some members of our profession may have possessed a more profound knowledge of certain special branches of the learning contained in books; few have been so widely read as the subject of this memoir. But Norman Moore was no mere bookworm steeped in book learning with no power to apply it to his environment. His vast knowledge was made subservient to the daily work, and whether he was attending a committee, instructing his clinical clerks in the wards, addressing a meeting, or engaged in familiar intercourse, he drew freely upon these rich stores to enforce an argument, "to point a moral, or adorn a tale." In his travels over all branches of literature, for some he evinced a special affection; history and biography had for him a great attraction, and in this field he passed the greater part of his literary career. For the *Dictionary of National*



SIR NORMAN MOORE, BT., M.D.

(After the portrait by R. G. Eves.)

Biography he wrote no less than 459 biographies, chiefly of medical men, and a perusal of those lives will show that he possessed a literary skill equal to Aikin, and an accuracy on a level with Munk. He once stated that he had never written a biography without first reading everything that the subject had written, and the condensed knowledge contained in these biographies readily attests the accuracy of the statement.

For years, when the subject was scarcely thought worthy of attention, Norman Moore was urging the importance of a study of the history of medicine, and he is entitled to be regarded as one of the founders of that branch of study in this country. Through his influence the FitzPatrick lectures in the History of Medicine were established at the College of Physicians, and in 1905 and 1906 he delivered the lectures, taking for his subjects "John Mirfield and Edward Browne in connexion with the education of physicians" and "The history of the study of clinical medicine in the British Isles." As Linacre lecturer in 1913 at Cambridge he chose as his subject "The physician in English history," and when called upon to deliver the Rede lecture in 1915 his subject was "St. Bartholomew's Hospital in peace and war." He was chosen President of the Section for the History of Medicine at the International Congress of Medicine in 1913, and at the Congress this year in London devoted to the history of medicine he was unanimously elected President of Honour. His pen was constantly employed in writing papers connected with the history of medicine, and among these may be mentioned *The History of Medicine in Ireland*, in 1910, and in conjunction with Mr. Stephen Paget, a history of the Royal Medico-Chirurgical Society in 1905. He was also a trustee of the British Museum, and had conferred upon him the distinction of being elected an Honorary Fellow of St. Catherine's College, Cambridge.

Norman Moore's type of mind naturally attracted him to mediaeval history, and in the centuries belonging to that epoch he was thoroughly at home. Perhaps his interest flagged when the seventeenth century was passed, but his knowledge even of modern literature would excite admiration in any circle. As evidence of his ability as a writer of archaeological and mediaeval history, towards the end of his life (in 1919) his *History of St. Bartholomew's Hospital* appeared. This book, containing a complete and exhaustive history of the hospital to which he was devoted, had occupied his leisure for more than thirty years, and is a fitting monument to his learning, research, and literary skill. Indeed, it is doubtful if the history of any institution has ever been written with such a wealth of detail. It was his last great effort, and worthily closes a brilliant literary career.

Quite early in his life (1871) he contributed an excellent memoir of Waterton as a preface to the collected Essays of that naturalist. He also translated the concise Irish grammar of Windish in 1882, and the following year he published a translation of the Irish text of the "Loss of the Crown of Loegaire Luc."

Norman Moore was twice married, first in 1880 to Amy Leigh Smith, daughter of William Leigh Smith of Crowham, Sussex, and secondly in 1903 to Millicent, daughter of Major-General John Ludlow. By his first wife he had two sons and a daughter. A son was killed in the war, and he is succeeded in the title by his son Alan Hilary.

His personal characteristics are almost too well known to require description. A man of intense convictions and great moral courage, regardless of the opinions of others in pursuing the course he believed to be right. Quick to see the central pivot in debate, he did not "suffer fools gladly," but was always ready to listen to opinions formed on serious grounds. As President of the College he ruled with prudence and dignity, and in all his actions in that capacity he adopted the position of a strictly constitutional ruler. He was the highest expression of that fast diminishing class of physicians who counted wide intellectual attainments the most important asset of the doctor, and the profession is infinitely poorer by his loss. Other men deeply versed in various branches of learning will arise in our profession, but it is doubtful if we shall see again a man endowed so bountifully with varied learning as Sir Norman Moore. It is not the purpose of this memoir to enter into personal and intimate details, but we may perhaps be permitted to say how much we have in mind to-day his unfailing kindness during a period of thirty-five years, and how valuable to us his high example has been. In the annals of the College he will take his place beside Freind, Mead, Sloane, and Askew. He himself would not have desired a higher honour. ARNOLD CHAPLIN.

Sir HUMPHRY ROLLESTON, President of the Royal College of Physicians of London, writes:

Numerous recollections and memories of kindnesses from Sir Norman Moore since 1881, when as warden of the college he admitted me as a medical student at St. Bartholomew's Hospital, are recalled by the death of this striking personality. He was a clear and emphatic teacher successively of comparative anatomy, pathology, and medicine, and often emphasized his remarks by historical instances. His literary and historical distinction has thrown into the shade the large amount of work he did in his earlier days in morbid anatomy; on this subject he wrote a textbook, gave the Bradshaw lecture (1889) at the College of Physicians, and was very active at the old Pathological Society of London, serving for eleven years on the Morbid Growths Committee. An outstanding characteristic was his affection for the old, whether men, manners, institutions, or books. While at Cambridge he was the disciple of Charles Waterton (1782–1865), the naturalist, whose life he wrote in 1871, and of Sir George Paget, the regius professor of physic; his acquaintance with men of learning is also shown by a letter of Professor John Richard Green (1837–83) referring in 1877 to "Norman Moore, one of the surgeons at St. Bartholomew's, but a man of marvellous knowledge in all Irish matters old and new. . . . Indeed, he is the only Irish person from whom I ever learned anything about Ireland." His devotion to the ancient foundation of Rahere is perpetuated in his splendid *History of St. Bartholomew's Hospital*, on which he was engaged for thirty years. This labour of love illustrates his gift for conveying in an attractive form the results of wide research, which in less able hands might easily have appeared dry-as-dust and uninspiring. As a medical biographer he was in the first flight, and was among the seven who contributed to all the original sixty-three volumes of the *Dictionary of National Biography*, and it is known that in constructing these 459 lives he followed the admirable rule of first reading all the published works of the man whose notice he was engaged on. Not only was his reading remarkably extensive and his memory wonderfully alert, but he had the power of aptly applying his stores of quaint knowledge and anecdote with a humour and manner particularly his own; he was thus for years pre-eminent as an after-dinner speaker in the medical world of London, and delighted his audience, especially when proposing the toast of the guests, by unexpected analogies and contrasts. Together with his pupil, Stephen Paget, he compiled the centenary volume (1805–1905) of the Royal Medico-Chirurgical Society, and thus performed for the premier medical society the same service, though infinitely less exacting, that he did for the oldest hospital of this city. At this society and its continuation the Royal Society of Medicine he was almost constantly in office, and from 1899 to 1918 was honorary librarian, only resigning when elected president of the Royal College of Physicians of London. This indeed would appear to have long been his ambition, and it may well be doubted if this high honour has ever been more deservedly won by long and unremitting devotion. From the onset he was a member of the important committee of management of the two colleges and thus was much concerned with the Conjoint Board examinations; for twenty-one years he was the representative of the College on the General Medical Council, and for seven years Harveian Librarian; further, he was instrumental in obtaining for the College the endowment of the FitzPatrick Lectures in the History of Medicine—a subject for which he did so much in this country, his position being clearly recognized by his selection as President of Honour of the recent International Congress of the History of Medicine in London. Though intensely interested in the traditions of the past, he had his finger on the pulse of present movements, and was an influential and efficient member of committees. For the honour and position of the College he was ever on the watch and never spared himself; in fact, it is not improbable that his self-sacrifice was instrumental in the rapid failure of his health that became apparent during his last year of office. The College loses a loyal friend, the like of whom it will not see again, and British medicine mourns a scholarly representative recalling the learned physicians of Linacre's ideal.

One of Sir Norman Moore's house-physicians writes:

The Editor has allowed me to see the admirable memoir written by Sir Norman Moore's successor in the office of Harveian Librarian, and the discerning tribute by his successor in Harvey's chair. It is most fitting that his life and work should be recorded in the BRITISH MEDICAL JOURNAL by

distinguished physicians who followed in his path, from Cambridge, through St. Bartholomew's, to high office in the Royal College of Physicians. As a younger son of these three great and ancient foundations, which were always in his thoughts, may I add a word from a rather different aspect? Dr. Norman Moore (to use the familiar name) was a good friend to young men, and showed his interest in practical ways. No pupil was ever forgotten. Those who earned his friendship kept it, and it went on from father to son. Little escaped that observant and critical eye; one quick look would sum up a new student's possibilities, or the fulfilment of early promise in an old student now shaping a career in practice. Dr. Norman Moore's clinical teaching was individual and personal, it had no direct relation to the passing of examinations; but his sayings stuck in the mind, and the drilling in accurate observation was of life-long value. The three chief things he taught at the bedside were consideration for the patient, careful study of the signs of disease, and precise statement of the facts observed. He praised a clear case-note, but paid no attention to the clinical clerk who tried to impress him with textbook knowledge; indeed, no learned man ever seemed to care less for pedantry. He was quick to note ability, but one of the most charming sides of his remarkable nature was his liking and respect for the unbookish man of action—the kind of student who after many disappointments at the examination hall wins success in the rough-and-tumble of practice. His afternoon visits to the wards had a civilizing effect on the rawest student, and his informal teaching communicated a point of view in clinical medicine which might colour a whole career. His racy allusion to old books and authors seldom fell on stony ground, because he would often add: "I do not want you to read these books because they are old but because they are good." Many such sayings stand out in the memory of his pupils. We remember, too, the unfailing loyalty and kindness to his house-physicians.

The funeral took place on the afternoon of Tuesday, December 5th, at Sedlescombe Churchyard, Sussex. Among those present at the graveside, with Lady Moore, Sir Alan Moore, Mrs. Marlborough Pryor, and other members of the family, were Sir Humphry Rolleston, President, and Dr. J. A. Ormerod, Registrar, of the Royal College of Physicians; Sir William Lawrence, Bt., Senior Almoner, and Dr. H. Morley Fletcher, Senior Physician, representing St. Bartholomew's Hospital; Mr. F. M. Rushmore, President and Tutor of St. Catherine's College, Cambridge; and Dr. N. G. Horner (BRITISH MEDICAL JOURNAL). A solemn Requiem Mass will be sung at St. James's, Spanish Place, to-day, December 9th, at 11 a.m.

SIR ISAAC BAYLEY BALFOUR, K.B.E., M.D., D.Sc., LL.D., F.R.S.,

Emeritus Professor of Botany in the University of Edinburgh.

ALTHOUGH Sir Isaac Bayley Balfour never practised medicine his was for many years (from 1888 to 1922) the first professor's voice heard by every Edinburgh medical student commencing his curriculum in the University; so he took his place in the great system of the teaching of the healing art, if not in the active prosecution of it. Although he was not appointed to the professorship (in succession to Professor Alexander Dickson) till 1888, he had already taught the class in 1876 and 1878; in the summer session of the latter year Sir Isaac's father, Professor John Hutton Balfour (affectionately known to that generation of students as "Woody Fibre"), began the lectures, but being immediately laid aside by illness his work was taken up and carried on till the end of the session by his son, then a brilliant young botanist of 25. The writer, who was a member of the class that summer well remembers the changed outlook upon botany which was revealed to the undergraduates when Dr. Isaac took his place at his father's lecturing desk. John Hutton Balfour was the author of a memorable textbook in two volumes; his teaching flowed smoothly along in the wake of that work, and there was no great danger (from the examination point of view) if a lecture or two were missed; Dr. Isaac Bayley Balfour put before the class the newer botany from Germany with its emphasis on histology, on embryology, and on the lowest and simplest forms of plant (or was it animal?) life; at once interest was aroused and enthusiasm excited, and the benches in the classroom in the Royal Botanic Garden were packed even before 8 a.m., the hour of lecture. The Saturday excursions, too, with an active young teacher eager to impart knowledge, leading the way over hill and dale, gained in popularity.

Dr. Bayley Balfour was born in Edinburgh in 1853, and received his education at the Edinburgh Academy and the University, graduating (with honours) M.B., C.M. in 1877, and gaining a gold medal for his M.D. thesis (botany of Socotra) in 1883. He had already taken part in the transit of Venus expedition to Rodriguez in 1874, and he published three years later his *Botany of Rodriguez*. Had a botanist accompanied the *Challenger* in its scientific voyage, it is more than likely that Dr. Balfour would have been the man. At this time he was an M.A. and B.Sc., and was taking out medical classes, acting also as assistant to Huxley, who was doing professorial duty in Edinburgh in 1875–6, and as dresser to Lister in 1876. In the year of his graduation as M.B. and C.M. he acted as assistant to Sir Wyville Thomson, the Professor of Zoology fresh home from the *Challenger* expedition. Later he worked with De Bary at Strasburg and also at Würzburg. As has already been stated, he lectured for his father in 1878, and in the following year he was appointed to the chair of botany in the University of Glasgow in place of Dickson, who had succeeded to the Edinburgh chair. In 1879 also, after the close of the classes, he explored the island of Socotra, making researches which he afterwards (1883) embodied in his gold medal thesis. In 1884 he was appointed Sherardian Professor of Botany in the University of Oxford and was elected a Fellow of the Royal Society. Three years later Balfour published his work of the *Botany of Socotra*, and then in 1888 he returned to his native city and his Alma Mater, having been appointed Regius Professor in the Univerity of Edinburgh and Regius Keeper of the Botanic Garden there.

John Hutton Balfour held the chair of botany for thirty-four years (1845–1879), and so did his son, Isaac Bayley Balfour (1888–1922). The son gave his time and energy pretty evenly between the teaching work of his chair and the care and improvement of the great Botanic Garden of which he was keeper. His work in both spheres was of the highest order. His lectures were always clear and intensely interesting, and his personal touch with his pupils was close and helpful to them. His reputation as a botanist was shown in various ways, more particularly perhaps by the fact that he was one of the first sixty botanists to receive from the Royal Horticultural Society the Victoria Medal of Honour. In time many other honours came to him, a knighthood in 1920, and the honorary LL.D. from Edinburgh University as recently as last July. He retired from the active work of his chair in April last. He has not been long spared to enjoy the rest and freedom from teaching responsibilities which his retirement promised, for he died on St. Andrew's Day (November 30th) at Courts Hill, Haslemere, the residence to which he had removed in the south. He married a daughter of the late Mr. Robert Balloch of Glasgow, by whom he had one daughter. Sir Isaac worthily maintained the high reputation which had become attached to the chair of botany in the university, and he and his father between them held the professorship for the long period of sixty-eight years. The newly equipped and extended Botanic Garden remains as a memorial in large part of the Balfour occupancy of the Regius professorship.

Dr. GRATTAN ROBERT CRONYN, who died on November 23rd, was the son of the late Dr. John Cronyn of Dublin. He was born at Kingstown, near Dublin, in 1864, and was educated at Foyle College, Londonderry. He served with the King's Liverpool Regiment for seven years in India, and on his return finished his medical training in Dublin at the Meath Hospital and the Rotunda. He took the diplomas of L.R.C.S.I., L.R.C.P.I., L.M. in 1896. For three years he acted as assistant to Dr. Pim of Barrowford, Lancashire, and then served as Civil Surgeon during the Boer war, in the Military Hospital, Dublin. For three years he examined recruits for the army at Liverpool, and then returned to Barrowford and assisted Dr. Pim for another two years. He went to Maidenhead in 1907 to take over the appointment of medical officer to the Union Infirmary and district. He held this appointment to the time of his death, and also worked up a large private practice. For ten years he had been on the honorary staff of the Maidenhead Hospital.

THE celebrated comparative anatomist and biologist, OSCAR HERTWIG, has recently died in Berlin at the age of 73.

Medical News.

A TROPICAL Diseases Committee has been appointed in connexion with the British Empire Exhibition to be held at Wembley in 1924. The chairman of the committee is Sir Humphry Rolleston, K.C.B., M.D., and the deputy chairman Major-General Sir W. B. Leishman, K.C.M.G., F.R.S. (War Office). The committee includes representatives of the Tropical Schools, the Natural History Museum, the Royal Navy, the Royal Colleges of Physicians and Surgeons in London, veterinary medicine, and also the India Office and the Colonial Office. The joint secretaries are Lieut.-Colonel W. W. Clemesha, C.I.E., M.D. (70, Victoria Street London, S.W.1), and Dr. S. H. Daukes, O.B.E. (Wellcome Bureau of Scientific Research, 25–27, Endsleigh Gardens, London, N.W.1). The chairman of the executive subcommittee is Dr. Andrew Balfour, C.B., C.M.G.

AT the social evening of the Royal Society of Medicine, to be held at 1, Wimpole Street, W.1, on Wednesday next, December 13th, Messrs. Marconi have arranged to install one of their newest models and a Magnavox loud speaker, which will enable the audience in the Robert Barnes Hall to enjoy a wireless concert without the necessity of using individual earpieces. It will begin at 8.20 p.m.; after the concert news too late for the evening papers, latest weather reports, and so on, will be delivered.

AT a general meeting of the members of the Royal Institution held on December 4th, when Sir James Crichton-Browne was in the chair, Sir Arthur Keith was elected secretary in succession to the late Colonel E. H. Grove-Hills. Professors Urbain (Paris), Ehrenfest (Leyden), Knudsen (Copenhagen), Bjerknes (Christiania), and Dr. Irving Langmuir were elected honorary members.

THE annual dinner of the London School of Medicine for Women (Royal Free Hospital) was held on Friday, December 1st, at the Holborn Restaurant, with Dr. Ethel Vaughan-Sawyer in the chair; 282 graduates, students, and their friends were present. The chairman, in proposing the toast of the school and hospital, referred to the loss sustained by the resignations of Dr. J. Walter Carr, senior physician, and of Miss Cox-Davies, the matron. The greatest need of the school at the moment was a suitable recreation ground for the students; there were 480 students with only one tennis court amongst them all. Mr. J. Gay French proposed the health of the guests in a felicitous speech, and Lord Riddell made a witty response. Several songs delightfully rendered by Madame Teresa del Riego added greatly to the pleasure of the evening.

AT the meeting of the Manchester Surgical Society, to be held in the library and reading room of the Manchester Medical Society, Medical School, Coupland Street, on Tuesday next, December 12th, at 8 p.m., papers will be read by Mr. M. Mamourian on massive excision of diseased bone followed by immediate or early bone-grafting, and by Mr. Garnett Wright on after-results of gastrectomy for ulcer. The discussions on the papers will be opened by Mr. Harry Platt and Mr. H. H. Rayner respectively.

A THREE months' course of lectures and demonstrations in hospital administration will be given at the North-Western Hospital, Hampstead, by Dr. E. W. Goodall, medical superintendent, on Mondays and Thursdays, at 5.15 p.m., beginning Monday, January 8th, 1923. The fee for the course is £3 3s.

AN extension of the nurses' home of the London Fever Hospital was recently opened by Lord Muir-Mackenzie. The building is four stories high, and the ground floor contains class and sitting rooms for 100 nurses. The other stories each provide seven bedrooms, and each has a sanitary wing.

THE *Times* correspondent in Berlin reports that malaria is prevalent in the centre of Russia and in the city of Moscow. Until the beginning of this year the area affected was restricted to the south-eastern regions—the marshy district of the Dnieper, the Don, Kuban, the Black Sea border of the Caucasus, and Transcaucasia. But from January to September, 1922, the number of cases registered in the government of Moscow alone was 25,280, and of these 2,223 occurred in the city. Similar or worse conditions prevail in the governments of Tver, Vladimir, Riazan, and in the Volga regions. It is reported that of the total number of persons affected 25 per cent. have died. It is added that adequate medical organization and supplies are wanting.

THE State Medical Officer of Texas recently announced that 500,000 cases of dengue had been reported in the State within a few weeks, but that the disease is not of a serious character. It was expected that the coming of cold weather, causing the death of the mosquitos, would end the epidemic.

THE forty-fourth autumn meeting of the Irish Medical Schools' and Graduates' Association was held at Pagani's Restaurant on November 30th, with the president, Dr. J. A. Macdonald, in the chair. There was a large attendance, including several members resident in Dublin. A letter of condolence was sent to the widow of Sir Charles Ryall. The members and their friends, to the number of 101, subsequently dined together, the guest of the evening being Professor Andrew S. Dixon. After the loyal toasts had been honoured, Dr. William Douglas proposed "Our Defenders," and Colonel George A. Moore replied. In proposing the health of the guests Dr. Gubbins Fitzgerald said that Trinity College, Dublin, of which Professor Dixon was such an ornament, had the reputation of welcoming to its halls men and women of every creed and every shade of politics; nothing contentious was allowed to interfere with the prosecution of studies. "Prosperity to the Association" was proposed by Sir Jenner Verrall, who congratulated the members on their good fortune in having as their president Dr. Macdonald, a man in whom were combined much wisdom, quick perception of points requiring proper consideration, and the courage to state his convictions without giving offence to those differing from him. The president, in reply, briefly narrated the origin of the association. The idea occurred to an old Portora boy, who had had long service abroad as an army surgeon, and he broached this in 1878 to a schoolfellow who had been serving abroad as a naval surgeon. The association now numbered nearly 700 members, whose homes were in every part of the world. Its success was due to the camaraderie it fostered and the exclusion from its meetings of everything connected, even remotely, with politics or polemics.

A MEETING of the Royal Benevolent Fund Guild was held at the house of the Medical Society of London on November 26th, when Lady Bradford, the president, introduced Mrs. Kendal, who took the chair. Mrs. Scharlieb, M.D., described the work of the Guild. Lady Fripp said that it was proposed to hold a dinner after Christmas, and many members present agreed to act as stewards, undertaking to collect £10 before January 30th or to bring eight or ten guests. Tickets can be obtained from Miss Swinford Edwards (68, Grosvenor Street, W.1) or Miss Fletcher (98, Harley Street, W.1). Under the auspices of the Ladies' Medical Golfing Society a bogey competition, open to all lady golfers, is to be held between January 1st and September 30th, 1923, for the benefit of the Guild. Play may be on any course, but the card must bear the special stamp (price 6d.) issued by the Guild, and be certified by a member of a recognized golf club. The lady who returns the best aggregate of five scores will win a silver cup. Further particulars and sheets of twenty stamps may be obtained from Lady Rigby (24, Queen Anne Street, W.1).

IN 1919 an Act was passed by Parliament providing for the registration of nurses for the sick. Under that Act a General Nursing Council was established, one of whose duties was the formation of the Register of Nurses. Work on its preparation has been going on steadily since that time, and the Minister of Health has given notice, as required by Statute, that the Register has now been compiled. The effect of this notice will be that after three months from December 5th (the date of the notice) the unauthorized use of the title "registered nurse" will render a person liable to a fine not exceeding £10 for a first offence and £50 for any subsequent offence. The first Register is now being printed, and will be published by the General Nursing Council, 12, York Gate, Regent's Park, N.W.1.

DR. WILLIAM BROWN, Wilde Reader in Mental Philosophy in the University of Oxford, has been added to the consulting staff of Bethlem Royal Hospital as honorary consulting psychologist.

A NATIONAL congress of medical practitioners was held at Rio de Janeiro in October, with Dr. C. Sampaio as president. Professor F. Mahalhaes delivered the opening address, on the thesis that "democracies succeed only when the authorities take as their guide the principles of social medicine." The meetings were organized by the Medical and Surgical Society of Rio, and lasted for a week; it was decided to form a Brazil Medical Association.

A CONVENTION of the Federation of the Experimental Biological Sciences will be held in the Faculty of Medicine of the University of Toronto on December 27th, 28th, and 29th.

A CANCER institute has just been opened at Madrid. Professor Goyanes, the director, supervised the building and equipment after visiting similar institutions in other European countries.

A NUMBER of cases of tropical malaria have recently been reported, according to the *Münchener medizinische Wochenschrift*, among persons who have never lived away from Berlin; none of them had any suspicion of the disease until it flared up under a course of salvarsan treatment.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediocra, Westrand, London;* telephone, 2630, Gerrard.

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin;* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361, Central).

QUERIES AND ANSWERS.

QUALIFICATION FOR M.O.H.

"K."—The Sanitary Officers Order, 1922, made by the Minister of Health, requires that a person who is appointed medical officer of health of a district shall be registered in the *Medical Register* as the holder of a diploma in sanitary science, public health, or state medicine, or shall have had not less than three years' previous experience of the duties of a medical officer of health. These requirements may be dispensed with by the Minister of Health if it appears to him desirable to do so. As our correspondent lives so near to a town in which there is a medical school he should have no difficulty in attending the necessary courses of training for the D.P.H. He will be able to obtain full information from the authorities of the school.

SAMWAYS'S ANCHOR TOURNIQUET.

DR. D. W. SAMWAYS (Mentone) writes: I found during the war that many of the anchors, on the anchor tourniquet which I designed many years ago, were not correctly made. The flukes of the anchor were too near the ring for the rubber tube to pass easily, the makers evidently thinking that some jamming action between the ring and flukes was necessary. None is necessary. The rubber tube jams itself by passing under the flukes and over the shank, and the pull of the rubber on the shank presses the flukes on the tube passing beneath them. The twists in the tube, and the compressions on it, hold it firmly. The shank of the anchor should always be made long enough for the rubber tube to pass on easily; otherwise skill or trouble, neither of which should be necessary, will be required to fix the tourniquet.

INCOME TAX.

"A" inquires as to what adjustment should be made between partners in the following circumstance: "A" and "B" were in partnership until "B" bought up "A's" two thirds share and the "practice house" as from June 30th, 1922.

*** The first and second instalment of income tax 1921-22 relate, of course, to the year ended April 5th, 1922, and should be paid and borne by "A" and "B" as if the subsequent change had not taken place. The income tax assessment Schedule D for 1922-23—for which the first instalment is payable in January, 1923—should be made or adjusted on the basis that "A" has one-fourth of two-thirds—that is, one-sixth of the profits and he should bear his share of the tax accordingly. The rates and income tax Schedule A payable on the house should be apportioned—for example, on the basis of half and half as regards the half-year to October, 1922, and the first income tax instalment 1922-23—between "A" and "B" unless there was some specific arrangement or allowance made in that connexion on the contract for sale.

LETTERS, NOTES, ETC.

INTRAUTERINE DECAPITATION.

DR. H. W. OGLE-SKAN (Hendon) writes: Dr. Pole's letter on this subject (November 25th, p. 1054) reminds me of the following incidents, which may be of interest. Mrs. "A." sent for me on a Friday afternoon a few weeks ago as she was three months pregnant and was having slight pains and some haemorrhage. Abortion appeared not inevitable, so I gave opium and told her to stop in bed. I was called urgently late on the Saturday evening to find that, not regarding the situation as serious, she had invited her friend, Mrs. "B.," round for the afternoon and evening while their husbands went to watch a cup tie. About 9 p.m. they thought they would go out to the nearest public-house and get some beer for their husbands on their return. While in the public-house Mrs. "A." felt very queer and had a glass of brandy and proceeded to walk home. While going along a dark lane Mrs. "A." was violently sick and felt something come from her. Mrs. "B." groped around in the dark and felt the "something," which she picked up and put in the basket of eggs she was carrying; on arriving home she found the "something" was a foetus without a head. She went for a nurse and telephoned me. On arrival I was shown the foetus minus a head, and on examination found the head in the vagina. I anaesthetized and removed the head and extracted the placenta from the uterus. On the Monday I was called to Mrs. "B." (who opened the door to me), and she showed me a pail in which was a foetus *she* had expelled early that morning. This one had a head all right! As no placenta was forthcoming next day I anaesthetized and removed a very adherent placenta piecemeal through an os which would not dilate more than enough to admit one finger. Mrs. "B.'s" foetus was also about three months. The coincidence was rather remarkable. Both women made an uneventful recovery.

THE SMALL-POX OUTBREAK AT POPLAR WORKHOUSE.

DR. H. LAIRD PEARSON (Birkenhead) writes: Dr. C. Killick Millard, writing on this subject, says: "It is interesting to learn that all of the 22 fatal cases in the present outbreak had been vaccinated." Now to substantiate his argument one needs to know if those fatal cases had been *efficiently* vaccinated. In last week's issue of the *Medical Officer* I have recorded a case (a contact) of a child aged 2 years with one "mark," who upon revaccination produced four perfect vesicles.

STRYCHNINE AND THE HEART.

DR. CHARLES J. HILL AITKEN (Kilnhurst, nr. Rotherham) writes: In the BRITISH MEDICAL JOURNAL of November 11th, 1922, Dr. John Hay, in his interesting article on cardiac failure, states that "strychnine has a wide and unwarranted reputation as a cardiac stimulant in Great Britain." Yet in the *Practitioner* for June, 1905, the late Sir Thomas Lauder Brunton wrote the following words: "In the *Medical Record* of 1874, p. 293, I abstracted a paper on the action of strychnine on the respiratory centres, and in a conjoint paper with Professor Cash (*St. Bartholomew's Hospital Reports*, vol. xvi, p. 229) I showed its powerful action as a cardiac stimulant. In my lectures on therapeutics for thirty years I have insisted upon the facts." Rather different statements which are an interesting contrast.

A DISCLAIMER.

DR. MACKENZIE STEEDMAN (Hounslow) writes: It has been brought to my notice that a paragraph appeared in the *Middlesex Chronicle* of December 2nd, giving prominence to my name and that of my assistant as being responsible for a blood transfusion. As this paragraph has, naturally, caused me some annoyance, and may lay me open to criticism from members of the medical profession, I shall be glad if you will give me this opportunity of disclaiming any knowledge whatever of the paragraph in question until my attention was called to it subsequent to publication.

FIRST AID IN COAL MINES.

IN reply to an inquiry published last week the Chief Secretary of the St. John Ambulance Association writes to call attention to the pamphlet *First Aid in Coal Mines*, which can be obtained (price 6d., by post 7d.) from the St. John Ambulance Association, St. John's Gate, Clerkenwell, E.C.1. We understand also that a useful book is *First Aid in Mining* by Louis G. Irvine (price 8s. 6d. net) published by the Book Department of the *Mining Magazine*, 724, Salisbury House, London, E.C.2. Messrs. John Bale, Sons, and Danielsson publish a card *First Aid in Few Words* by Dr. J. M. Carvell which we are informed is in use by many factories, collieries, and railways.

MESSRS. GRAFTON AND CO., publishers (Coptic House, Coptic Street, London, W.C.1), write: Will you allow us space in your columns to say that we have no connexion whatever with the firm calling themselves the Grafton Publishing Company and circularizing a publication entitled "London Doctors and Dentists"? Their circulars do not appear to bear sufficient address, and correspondence has been sent to this address.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 55, 58, 59, and 60 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 56 and 57.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *213*.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

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An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.